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(continued on inside back cover)

Scopus 25: 1–22, December 2005

The avifauna of coastal forests in southeast Tanzania

Flemming P. Jensen, Anders P. Tøttrup and Kim D. Christensen

The avifauna of the coastal forest patches between the Rufiji and Ruvuma Rivers, southeast Tanzania, have so far received little ornithological attention compared to, for instance, the montane forests of the Eastern Arc Mountains. This is surprising given the large number of studies of other animals and plants that have documented high species richness and, especially for trees, very high numbers of species with restricted distributions (Clarke *et al.* 2000).

This paper summarises information on the distribution of forest birds in the 11 coastal forests in Tanzania south of the Rufiji River for which we have been able to trace data and from our own fieldwork in six forests in 2001. We also include information on old records of forest birds collected near Mikindani although the exact location is unknown. We briefly discuss the species richness of the forests, make a comparison with some other Tanzanian lowland forests and provide new information on distribution and habitat selection of some of the forest birds encountered during our fieldwork. Finally, we explore the hypothesis that the Lindi Plateau forests in the southern part of the study area were a refugium for lowland forest birds during Pleistocene glaciations and that the isolation led to differentiation and the formation of a local centre of endemism.

Study area

A vegetation mosaic of lowland forest, *Brachystegia* forest (*sensu* Clarke 2000a), thicket and fire-climax miombo woodland, together with varying intensities of cultivation and 'farm-bush' occurs along the coast of Tanzania between the Rufiji and Ruvuma Rivers (Clarke 2001). Although a few forest patches (e.g. Kitope and Ndimba Hills) occur on isolated hills close to the sea, most coastal forests are found on or around a row of upland massifs in the coastal hinterland (Clarke 1995, Burgess *et al.* 2000; see Figure 1). The forests are believed to be geographically-isolated remnants of a more widespread evergreen or semi-evergreen closed-canopy forest that has been largely cleared from the heavily-populated coastal region to provide wood and farmland (Clarke & Karoma 2000). This Eastern African coastal forests complex has a geographical range from southern Somalia, through coastal Kenya and Tanzania, to southern Mozambique (Clarke 2000a).

A large number of coastal forests of very different sizes have been reported between the Rufiji and Ruvuma Rivers (e.g. Clarke 1995). Fottland (1996) listed some 37 Forest Reserves for this area though several of these have now been logged. Other Forest Reserves contain different types of woodland rather than forest.

Investigations of the forest avifauna of southeast Tanzania were initiated during the colonial era. More recently, Stjernstedt (1970) visited Rondo

Figure 1. Location of the 11 coastal forests and Mikindani in southeast Tanzania.

briefly in 1967–1968 but most information comes from visits in the late 1980s and early- to mid-1990s (Bagger *et al.* 1990, Burgess *et al.* 1991, Faldborg *et al.* 1991, Holsten *et al.* 1991, Eriksen *et al.* 1994, Baker & Baker 2002). In 2001 we studied the forest bird assemblages of six coastal forests in the Lindi region. Ornithologists visited three of these in the 1990s, but the other three appear not to have been surveyed before.

Methods

Bird surveys were conducted at six coastal forests between October and December 2001 (Kitope, Namatimbili, Ngarama, Ndimba, Ruawa and Chitoa Forests). One, two or three ornithologists worked for three to seven days at each location. A combination of systematic observations and mist-netting was used (except in Ruawa forest where no mist-netting was carried out). Observations were made using the Fjeldså (1999) modification of the Mackinnon list method (Mackinnon & Phillipps 1993). The observer slowly walks (~1–2 km/hour) along natural paths and tracks and writes down all bird species seen or heard. Lists are made within a defined study site of 1.5–2 km^2 in order to ensure that the observations are associated with a particular area. In order to detect elusive ground-dwelling species, between six and 12 six-metre mist-nets were operated in a variety of habitats within the study area.

We also brought together information from all the other forests we were able to trace data for in order to present an overview of the current knowledge of the avifauna in coastal forests of southeast Tanzania. In addition to observations from previous surveys of three of the sites we visited, this included information from five other forests (see Table 1). We have also included records of forest birds collected by Thorkild Andersen in the mid-1960s near Mikindani. Britton (1978, 1980 and 1981) reported on a number of these specimens from forest and "coastal thickets" near Mikindani but we add some previously unreported records based on Andersen skins housed at the Zoological Museum in Copenhagen (ZMUC) and the Naturalis Museum in Leiden (J. Fjeldså, pers. comm.).

We categorise species according to their dependence on forest habitat following Mlingwa *et al.* (2000) where Forest Specialists (FF) are typical of the forest interior and likely to disappear when the forest is modified and Forest Generalists (F) occur in undisturbed forest but are able to exist at the forest edge or in modified and fragmented forests but continue to depend upon forest for some of their resources, such as nesting sites.

A number of forest birds in Tanzania are thought to undertake seasonal altitudinal migration between montane forests of the Eastern Arc Mountains and foothill or coastal forests (see Mlingwa *et al.* 2000). Although still little-understood these movements away from highland forests seem to occur mainly during the cool, dry period. In southern Tanzania this is from June to November (Pratt & Gwynne 1977). The birds then return to the

mountains with the onset of the rain around November to December, which also corresponds to the beginning of the breeding period (Moyer 1993). We use the term 'cold season' to refer to the period from the beginning of June to the end of October.

The taxonomy and nomenclature follow the Ornithological Sub-committee of the EANHS (1996) except for bush-shrikes where we follow Harris & Franklin (2000).

Results

Species richness

A total of 100 bird species have so far been recorded from the 11 studied coastal forests in southeast Tanzania and at Mikindani (see Appendix). Sixty-one of these are forest dependent, with 22 being FF species and 39 F species (Table 2). Rondo and Litipo Forests have the highest number of FF species (21 and 18 respectively). Only Rondo forest has so far been the subject of a good sampling effort (see Table 1) with all but possibly a few cold season migrants likely to have been recorded. Future fieldwork is likely to increase the number of forest dependent species in several of the other forest areas, in particular at Mitundumbea, Ruwuwa and Mbwalawala Plateaus where the sampling effort has been low. A better coverage between June and November may also prove that more forest species migrate to the southeast Tanzanian forests during the cold season.

In some lowland forests north of the Rufiji River even higher numbers of FF species have been recorded. For instance, in the foothill forests of the East Usambaras, 28 FF species occur and in the forest of the Pugu Hills there are 25 FF species (data from Mlingwa *et al.* 2000). The higher numbers of FF species in the Pugu forests compared to the forests south of the Rufiji is partly caused by more montane species reaching this lowland forest during the cold season (e.g. Stripe-cheeked Greenbul *Andropadus milanjensis* and Orange Ground Thrush *Zoothera gurneyi*).

Rare and threatened species

Two globally threatened bird species (East Coast Akalat *Sheppardia gunningi* and Spotted Ground Thrush *Zoothera fischeri*) and two near-threatened species (Southern Banded Snake Eagle *Circaetus fasciolatus* and Plain-backed Sunbird *Anthreptes reichenowi*) occur in the coastal forests of southeast Tanzania (BirdLife International 2004). Only the sunbird is relatively widespread and common in southeast Tanzania and during our fieldwork in 2001 we were able to add two new sites and extend the range of the southeast Tanzanian population north to Namatimbili. The akalat was previously known from only three forest sites in southeast Tanzania but during our fieldwork in 2001 we discovered a small, unknown population at a fourth site, the Ruawa Forest.

Table 1. Summary of fieldwork effort at coastal forests in southeast Tanzania during the late 1980s, the 1990s and in 2001. nmh = no. of nets x metres x hours. Survey effort ranked accounting for forest area, number of visits by ornithologists, length of their visits, number of observers, extent of mist-netting and seasonal coverage. 1 = poor: short visits, little or no mist-netting carried out, several resident forest-dependent species and cold-season visitors likely to be unrecorded. 2 = medium: one thorough or several brief visits, some mist-netting. Most resident forest-dependent species likely recorded, only one or two likely overlooked, several cold-season migrant species likely undetected. 3 = good: much fieldwork in all seasons with extensive mist-netting. All resident forest-dependent species likely recorded, very few cold-season migrants likely overlooked.

Plateau or hill	Forest	Area closed forest	Dates	Field effort	nmh	Sample effort
Matumbi Massif	Kiwengoma Forest Reserve	2200 ha[a]	January–March 1990[b]	17 days x 2 observers	*c.* 25 000	2
Kitope Hill	Kitope Forest Reserve	600 ha[a]	18–23 October 2001[c]	6 days x 3 observers	3100	2
Mitundumbea Plateau	Namatimbili at northern border of Mitundumbea Forest Reserve	300 ha[a]	23–27 November 2001[c]	4 days x 1 observer	2400	1
Ruwuwa Plateau	Ngarama North and South Forest Reserves	1000 ha[a]	4–16 March 1993[d]	13 days x 4 observers	7756	2
			1–3 December 2001[c]	2.5 days x 1 observers	540	
Mbwalawala Plateau	Pindiro Forest Reserve	500 ha[a]	15 March 1993[d]	1 day (observers unknown)	none	2
			11 June–5 July 1993[d]	27 days (observers unknown)	none	
Ndimba Hill	Ndimba Forest Reserve	*c.* 1400 ha*	1996[g]	-	-	2
			1–6 October 2001[c]	6 days x 2–3 observers	2900	
Ruawa–Likonde Plateau	Ruawa Forest Reserve	*c.* 600 ha*	December 2001[c]	4 days x 2 observers	none	2
Chitoa Plateau	Chitoa Forest Reserve	600 ha[a]	26–27 March 1993[d]	1 day x 2 observers	none	2
			6–8 December 2001[c]	4 days x 2 observers	2800	
Chitoa Plateau	Litipo Forest Reserve	400 ha[a]	28 February–7 March 1989[e]	8 days x 4 observers	*c.* 15 400	2
			3–9 July 1990[f]	7 days x 5 observers	*c.* 12 500	
			19–28 March 1993[d]	10 days x 4 observers	6660	
Rondo Plateau	Rondo Forest Reserve	2500 ha[a]	16 October–3 December 1988[g]	3 observers	unknown	3
			15–26 February 1989[e]	12 days x 4 observers	*c.* 26 400	
			11–18 July 1990[f]	8 days x 5 observers	*c.* 17 500	
			16–28 February 1993[d]	13 days x 4 observers	9235	
			29 March–1 April 1993[d]	4 days x 4 observers	2352	
			January– February 1996[g]	-	-	
Makonde Plateau	Nyangamara Forest	600 ha[d]	21–24 July 1990[f]	4 days x 5 observers	*c.* 5000	1

[a]Burgess & Clarke (2000), [b]Burgess *et al.* (1991), [c]this study, [d]Eriksen *et al.* (1994), [e]Bagger *et al.* (1990), [f]Faldborg *et al.* (1991), [g]N. Baker *in litt.*, *our estimate.

Notes on status of selected species

In the following accounts, new information concerning distribution and habitat preferences is presented for selected species. The global threat status mentioned below is the current IUCN Red List Category according to BirdLife International (2004). We also provide new information on distribution and habitat selection of a number of other bird species encountered during field studies in the late 1980s and early 1990s as well as during our fieldwork in 2001.

Southern Banded Snake Eagle *Circaetus fasciolatus*

This globally near-threatened bird of prey (BirdLife International 2004) is a low-density resident in coastal woodlands and forests from south Somalia to South Africa (Snow 1978, Brown *et al.* 1982). Southern Banded Snake Eagles seems to be very locally distributed in southeast Tanzania, recorded only in forests on the Matumbi Massif (Burgess *et al.* 1991), the Mbwalawala Plateau (Eriksen *et al.* 1994), Chitoa Plateau (Litipo Forest, Eriksen *et al.* 1994) and Rondo Plateau (Faldborg *et al.* 1991, Holsten *et al.* 1991, Eriksen *et al.* 1994, this study). From the Rondo Plateau there are also observations from farmland adjacent to Rondo Forest (Faldborg *et al.* 1991) and from woodland west of Rondo Forest in October 2001 (Tøttrup *et al.* 2005). Seddon *et al.* (1999) suggest that this species may breed in lowland forest and winter in submontane forests. Although this may be the case for populations further to the north in Tanzania, observations of Southern Banded Snake Eagles from Rondo Plateau in March, July, October and November (Holsten *et al.* 1991, Faldborg *et al.* 1991, Eriksen *et al.* 1994, this study) do not suggest that this is the case in southeast Tanzania.

Lemon Dove *Aplopelia larvata*

In East Africa this dove is mainly recorded from montane forests up to 3000 m (Britton 1980), but there are also records from the foothills of the Eastern Arc Mountains: one at 450 m in the foothills of the West Usambaras

Table 2. Summary of species richness in each site, by forest-dependence categories. MA = Matumbi Massif—Kiwengoma Forest Reserve; KI = Kitope Hill—Kitope Forest; MT = Mitundumbea Plateau—Namatimbili; RU = Ruwuwa Plateau—Ngarama North and South Forest Reserves; MB = Mbwalawala Plateau—Pindiro Forest; ND = Ndimba Hill—Ndimba Forest; RL = Ruawa-Likonde Plateau—Ruawa Forest Reserve; CH = Chitoa Plateau—Chitoa Forest Reserve; LI = Chitoa Plateau—Litipo Forest Reserve; RO = Rondo Plateau—Rondo Forest; MK = Makonde Plateau—Nyangarama Forest; MI = Mikindani. FF = Forest Specialists, F = Forest Generalists.

	Forests												
	MA	KI	MT	RU	MB	ND	RL	CH	LI	RO	MK	MI	Total
FF	12	10	13	16	13	13	14	16	18	21	5	11	22
F	24	24	25	32	29	23	21	23	31	34	17	16	39
Total	36	34	38	48	42	36	35	39	49	55	22	27	61

on 14 May 1981 and one at 300 m on 19 July 1981 in lowland forest east of the Uluguru Mountains (Stuart & Jensen 1981a). Furthermore, one was mist-netted at 300 m in Magombera Forest in the foothills of the Udzungwa Mountains on 14 September 1984 (Stuart *et al.* 1987). These observations have been taken as a possible indication of seasonal movements to lower altitudes outside the breeding season (Stuart & Jensen 1981b, Stuart *et al.* 1987).

In southeast Tanzania Lemon Dove is only known from Rondo and Litipo Forests where it seems to be rare with only very few observations made. An observation of two birds in Litipo Forest between 28 February and 7 March 1989 (Bagger *et al.* 1990) remains the sole record from this forest. At Rondo, Holsten *et al.* (1991) made a few observations in November 1988 and there is also a single observation from June in the Tanzania Atlas Database (N. Baker in litt.). Since the records are outside the period for cold season movements of montane populations, the Lemon Doves in Litipo and Rondo are thought to belong to small resident populations.

Green Barbet *Stactolaema olivacea*

This barbet, found in both lowland and highland forest, has a local and disjunct distribution. It is found in a few coastal forests in Kenya, Tanzania and Natal while montane populations occur in Tanzania, Malawi and Mozambique (Fry *et al.* 1988).

In southeast Tanzania it was first recorded from Nchingidi on the Rondo Plateau, where a few birds were collected in the 1930s and subsequently assigned to an endemic subspecies *hylophona* by Clancey (1979). Fieldwork between October and December 1988 (Holsten *et al.* 1991), February 1989 (Bagger *et al.* 1990), July 1990 (Faldborg *et al.* 1991) and February to April 1993 (Eriksen *et al.* 1994) strongly suggests that this species has a large resident population in Rondo Forest. Surprisingly, it has never been recorded from Litipo or Chitoa Forests only 20–30 km away. However, in December 2001, we observed Green Barbets in Ruawa Forest *c.* 50 km northeast of Rondo Forest. During our brief visit to Ruawa Forest it was recorded every day and appeared to be common.

Further to the north, Green Barbet has been recorded from Ngarama North and South Forest Reserves on the central and southern parts of the Ruwuwa Plateau in March 1993, where it was found to be uncommon (Eriksen *et al.* 1994). During a brief visit in December 2001 a single bird was recorded during three days of fieldwork. Surprisingly, in November 2001, we found it in high numbers at Namatimbili just north of Mitundumbea Forest Reserve. Here it was common in tall riparian forest and was also recorded from drier forest on the plateau.

It has not been possible to determine the subspecies of the Green Barbets observed at Ruawa, Ngarama or Namatimbili but they are most likely *hylophona* due to their proximity to the original population.

Eastern Green Tinkerbird *Pogoniulus simplex*

This coastal forest near-endemic (*sensu* Mlingwa *et al.* 2000) occurs in coastal forests in Kenya and Tanzania and is also found in foothill forests of some of the Eastern Arc Mountains (Fry *et al.* 1988). Further to the south it occurs in coastal Mozambique and forested hills and small mountains further inland in Mozambique and Malawi (Fry *et al.* 1988).

In southeast Tanzania it is relatively widespread and common in the coastal forests from the central part of the Ruwuwa Plateau and Mbwala-wala Plateau south to Rondo, Litipo and Chitoa Forests (see Appendix). It seems to be more numerous in the southern part of this area.

African Broadbill *Smithornis capensis*

In southeast Tanzania this is a widespread species recorded from all the surveyed forests. We found it to be a surprisingly common species in Kitope, Namatimbili, Ndimba, Ngarama, Ruawa and Chitoa forests, although it is easily overlooked if not for the noisy display flight at dawn. We also found it to be common in denser parts of woodland in southeast Tanzania, sometimes far from coastal forests (Tøttrup *et al.* 2005).

African Pitta *Pitta angolensis*

The East African population of this species has long been known to breed in dense deciduous thickets in southeast Tanzania between December and April, and spend the rest of the year in the forests of southern and western Uganda and in forest patches along the Kenya coast (Britton 1980).

Recent fieldwork has shown that African Pittas also occur in more dense vegetation in southeast Tanzania and, at least occasionally, breed in coastal forests. Thus it appears to be relatively common in dense coastal forest at Ndimba, Rondo, Litipo, Chitoa and Kiwengoma forests during its breeding period (N. Baker in litt., Bagger *et al.* 1990, Holsten *et al.* 1991, Burgess *et al.* 1991, Eriksen *et al.* 1994). The earliest observation was made on 19 November 1988 in Rondo (Holsten *et al.* 1991). Six nests were found in Kiwengoma forest during January to March (Burgess *et al.* 1991) and one nest was located in Rondo Forest on 23 February 1993 (Eriksen *et al.* 1994). We observed African Pittas in Ruawa Forests and at Namatimbili just outside Mitundumbea Forest Reserve in December 2001 but no nests were found. At Namatimbili it was common in closed riparian forest while it occurred in much lower densities in the surrounding dense woodland.

Tiny Greenbul *Phyllastrephus debilis*

The nominate form has two widely-separated populations: in coastal forests in southeast Tanzania and in coastal Mozambique between the Zambezi and Limpopo Rivers some 1200 km to the south (Keith *et al.* 1992). The Mozambique population penetrates inland to eastern Zimbabwe (Keith *et al.* 1992). The subspecies *rabai* is widespread in coastal Kenya from Tana River south to the Rufiji River in Tanzania while a montane subspecies, *albigula,* is found in the Usambaras, Ngurus and Ulugurus (Keith *et al.* 1992).

In southeast Tanzania it is common in most coastal forests south of the Rufiji River (Bagger *et al.* 1990, Holsten *et al.* 1991, Burgess *et al.* 1991, Eriksen *et al.* 1994, this study) with one inland record at Liwale (Britton 1980). Only from the Makonde Plateau at Ngarama Forest and at Mikindani does it seem to be missing. Since there are no records from coastal forests in Mozambique north of Beira the strange 1200 km gap in the distribution of the nominate form is probably real. Outside the breeding season we often observed Tiny Greenbuls in parties with other *Phyllastrephus* greenbuls, in particular Yellow-streaked Greenbul *P. flavostriatus* and Fischer's Greenbul *P. fischeri*.

Fischer's Greenbul *Phyllastrephus fischeri*

A common species in forests and coastal thicket undergrowth from extreme south Somalia, through coastal Kenya and Tanzania, south to northern Mozambique (Keith *et al.* 1992). It is also found in foothill forests of Eastern Arc Mountains from the East Usambaras, Ulugurus (up to 850 m) and the Udzungwas (Keith *et al.* 1992, Svendsen & Hansen 1995). In southeast Tanzania this greenbul is common in most coastal forests (Bagger *et al.* 1990, Holsten *et al.* 1991, Burgess *et al.* 1991, Eriksen *et al.* 1994, this study). Andersen collected 18 specimens in the 1960s near Mikindani, now housed at the ZMUC and the Naturalis Museum, but strangely it has not been recorded from the Makonde Plateau. In October 2001 we recorded it in patches of dense thickets in woodland at Kikole some 50 km inland of Kilwa Kivinje, while it remained unrecorded in woodland on the Rondo Plateau 5–10 km west of the forest reserve (Tøttrup *et al.* 2005).

White-chested Alethe *Alethe fuelleborni*

This is primarily a montane species breeding in the Eastern Arc Mountain forests from the Usambaras south into mountains of northern Malawi and adjacent Zambia (Keith *et al.* 1992). In the 1960s a very isolated breeding population was discovered in a forest near Beira on the coast of Mozambique (Clancey & Lawson 1969, Jensen *et al.* 1985, Jones 1999). In Tanzania it mainly occurs above 1000 m at the onset of the breeding season in November to December (Romdal 2001), but during the cold period many birds descend to groundwater forests in the Eastern Arc foothills (Stuart & Jensen 1981a, 1981b, Stuart *et al.* 1987). Records from Bombo East north of the Usambara Mountains in August (Cordeiro & Githiru 1998) and Pugu Hills (Mlingwa *et al.* 2000) are usually considered to be visitors from montane forests.

On 26 March 1993 two White-chested Alethes were observed at close range in Chitoa Forest (Eriksen *et al.* 1994, Eriksen pers. comm.) outside the time of year for seasonal altitudinal migration to lowland forests. During a short visit in December 2001 when some mist-netting was conducted we found no trace of this species. Thus it remains unclear whether a small resident population occurs in Chitoa Forest or whether the birds observed in March 1993 were casual visitors from montane forests further inland.

East Coast Akalat *Sheppardia gunningi*

This Vulnerable species (BirdLife International 2004) is restricted to a few coastal forests in Kenya and Tanzania (subspecies *sokokensis*, Britton 1980, Waiyaki & Bennun 2000) with an isolated population on the coast of central Mozambique (the nominate form, Keith *et al.* 1992). Furthermore, there are submontane populations (subspecies *bensoni*) in Malawi (Keith *et al.* 1992) and the recently-discovered endemic montane subspecies *alticola* on Nguu Mountain in Tanzania (Seddon *et al.* 1999, Fjeldså *et al.* 2000).

In southeast Tanzania it was only known from three coastal forests: Rondo, Litipo and Chitoa (Holsten *et al.* 1991, Bagger *et al.* 1990). However, in 2001, we discovered a fourth population in Ruawa forest. While it appears to be common in Rondo, Litipo and Chitoa forests, only three observations were made in Ruawa in spite of intensive searching (though without mist-netting).

East Coast Akalat was found to be sensitive to habitat structure and disturbance in coastal forests in Kenya (Nemeth & Bennun 2000), while it was found in a range of habitats from tall, little-disturbed forest to heavily-disturbed evergreen thickets and secondary growth regenerating after logging in the East Usambaras (Evans 1997, Evans *et al.* 1994). Although the habitat preference of this species has not been studied in Tanzania, its restriction to the only four sites with what appears to be the most intact coastal forest in this region suggests a high dependency on primary forest for this population.

Spotted Ground Thrush *Zoothera fischeri*

BirdLife International (2004) categorises this species as Endangered. The nominate form of this elusive thrush is an intra-African migrant moving between breeding grounds in southeast Tanzania and a non-breeding area in coastal Kenya, where it occurs between late March and late November (Bennun 1985). Other populations are known from a few scattered sites in south Sudan, south Zaire, Malawi and South Africa (Collar & Stuart 1985).

The only known breeding area for the nominate form is Rondo Forest where the records are few and the numbers recorded suggest a very small population: six birds with large brood patches were mist-netted in November 1988 (Holsten *et al.* 1991) and four more in late February 1989, also with brood patches (Bagger *et al.* 1990). Two with large brood patches were found on 25 February 1993 and another two on 31 March 1993 (Eriksen *et al.* 1994). In February 1996 three actively-breeding birds were ringed (N. Baker in litt.). A single observation from the nearby Litipo Forest in early March 1989 (Bagger *et al.* 1990) is the only record outside Rondo Forest from southeast Tanzania. A subsequent ten-day visit to Litipo Forest in late March 1993 within the potential breeding period in southeast Tanzania recorded no birds despite considerable searching (Eriksen pers. comm.). Four days of intensive searching, including mist-netting, in Chitoa Forest in December 2001 also proved fruitless (this study), stressing the importance

of Rondo Forest as a breeding area for the nominate Spotted Ground Thrush.

Kretschmer's Longbill *Macrosphenus kretschmeri*

This species is a Tanzanian near-endemic; a population is also found at Netia on the coast of northern Mozambique (Urban *et al.* 1997) and there are earlier records from Kitovu Forest in Kenya (Zimmerman *et al.* 1996). The nominate form is one of the commonest birds in the lowland forest in the Rubeho Mountains (Fjeldså *et al.* 1997) while it is generally an uncommon resident of forest edge and forest undergrowth at medium altitude in the Usambaras, Ulugurus, Ngurus and Udzungwas (Fjeldså & Rabøl 1995, Urban *et al.* 1997). It is also locally common in forests extending down from Mt. Kilimanjaro (N. Baker in litt.). Small populations in four coastal forests in Tanzania north of the Rufiji also belong to the inland nominate form (Mlingwa *et al.* 2000). The subspecies *griseiceps* was described from Mikindani in 1911 (Mackworth-Praed & Grant 1960) and birds from Netia in Mozambique are also assigned to this subspecies.

Recent records of Kretschmer's Longbill from southeast Tanzania are few. Four specimens housed at the Zoological Museum in Copenhagen were collected in 1965 in coastal thickets near Mikindani. In 1990 a population was discovered in Kiwengoma Forest, where it was "seen once every 2–3 days" during the 2.5 weeks visit (Burgess *et al.* 1991). A single bird was mist-netted in Rondo Forest on the 14 July 1990 (Faldborg *et al.* 1991). Several were subsequently seen in January to February 1996 when two birds also were mist-netted (N. Baker in litt.). In January to February 1996 a few were also observed in Litipo Forest (N. Baker in litt.).

Forest Batis *Batis mixta reichenowi*

The taxon *reichenowi* is confined to coastal forests in southeast Tanzania from Kitope Hill south to Mikindani. It was treated as an isolated subspecies of the Cape Batis *Batis capensis* by Urban *et al.* (1997) and Harris & Franklin (2000), while Collar *et al.* (1994) and Mlingwa *et al.* (2000) raised it to the rank of a full species. However, until DNA studies shed more light on its systematic position we follow Britton (1980) and the Ornithological Subcommittee (1996) in considering it a subspecies of the Forest Batis *Batis mixta.*

Among the coastal forests south of the Rufiji it was unrecorded only from Kiwengoma Forest on the Matumbi Massif. It is a common bird in Kitope, Rondo, Litipo and Chitoa Forests but less so in the other coastal forests (Bagger *et al.* 1990, Holsten *et al.* 1991, Burgess *et al.* 1991, Eriksen *et al.* 1994, this study). It should be noted that Eriksen *et al* (1994) found it to be uncommon in the forests of the Ruwuwa Plateau in March 1993 while we found it to be relatively common there and recorded it daily in December 2001. During fieldwork on the Rondo Plateau and just north of Mitarura Forest Reserve in 2001 we found East Coast Batis *B. soror* to be common in

the woodland while Forest Batis was never observed in this habitat. Both species also occur on the Mitundumbea and Ruwuwa Plateaus where *B. soror* is common in woodland vegetation and *B. mixta reichenowi* restricted to denser vegetation such as riparian forest (Eriksen *et al.* 1994, this study).

Green-headed Oriole *Oriolus chlorocephalus*

This oriole is a local resident of some coastal forests in Kenya while in Tanzania it is mainly associated with the lower slopes of Eastern Arc Mountains from the Usambaras to the Udzungwas (Fry *et al.* 2000). Other populations occur at higher altitudes in Malawi and northern Mozambique (Fry *et al.* 2000).

Old records of an isolated population in Rondo Forest are mentioned in Mackworth-Praed & Grant (1960) and Snow (1978). Between 1988 and 1993, when extensive fieldwork was carried out on the Rondo Plateau, only a single sighting was made, when an adult was observed on 13 July 1990 (Faldborg *et al.* 1990). However, in January to February 1996 several Green-headed Orioles were seen in Rondo Forest (N. Baker in litt.), suggesting that, although rare, this species still has a small population at Rondo.

Livingstone's Flycatcher *Erythrocercus livingstonei* and Little Yellow Flycatcher *E. holochlorus*

These two flycatchers form a superspecies with Livingstone's Flycatcher occurring south of the Rufiji River and Little Yellow Flycatcher north of the river (Urban *et al.* 1997).

Livingstone's Flycatcher is common and widespread in forests in southeast Tanzania only missing from Kiwengoma and Namatimbili. However, both of these forest areas are relatively little surveyed so it could have been overlooked there. Holsten *et al.* (1990) lists a record of Little Yellow Flycatcher from Rondo (and many Livingstone's Flycatchers from the same area). This remains the only observation of Little Yellow Flycatcher south of the Rufiji and we believe it must have been a misidentified Livingstone's Flycatcher.

Uluguru Violet-backed Sunbird *Anthreptes neglectus*

This sunbird occurs in a few coastal forests in Kenya (where it is rare), in coastal forests in Tanzania and northern Mozambique and in low- and medium-altitude forests of the Eastern Arc Mountains from the Usambaras to the Udzungwas (Fry *et al.* 2000).

In coastal Tanzania south of the Rufiji it has been recorded from most surveyed forests but always at low densities. There are old records from Mikindani (Britton 1980) but no recent observations in coastal forests south of Lindi or on the Makonde Plateau. It has been observed in small numbers in Rondo Forest, Chitoa and Litipo Forests (Bagger *et al.* 1990, Faldborg *et al.* 1991 Holsten *et al.* 1991 and Eriksen *et al.* 1994). We recorded it in Ruawa Forest in 2001 but failed to locate it in the forest on Ndimba Hill. On the Ruwuwa Plateau there are a few records from the central section in

Ngarama North Forest Reserve (Eriksen *et al.* 1994) and we observed it in the northernmost part of the Mitundumbea Plateau at Namatimbili in 2001. It may be more common on the Mbwalawala Plateau where Eriksen *et al.* (1994) recorded it almost daily in Pindiro Forest Reserve. It was also seen a few times in Kiwengoma Forest on Matumbi Massif (Burgess *et al.* 1991) and in the forest on Kitope Hill (this study).

Its general habitat in coastal areas is described as forest and nearby moist woodland, riparian forest and adjacent moist bush (Fry *et al.* 2000) but it has also been recorded in heavily-degraded sub-montane forest and cultivated areas in the Nguu Mountains (Seddon *et al.* 1999). In the Matundu and Mahenge area it has often been recorded in miombo woodland with a certain degree of semi-evergreen vegetation (J. Fjeldså, pers. comm.). Fry *et al.* (2000) furthermore note that Uluguru Violet-backed Sunbird must meet Western Violet-backed Sunbird *A. longuemarei* in the miombo woodland–forest mosaic of coastal Tanzania but that they must be largely mutually exclusive ecologically there. In coastal southeast Tanzania Uluguru Violet-backed Sunbird appears not to occur in woodland habitats but has so far only been recorded from coastal forests, riparian forest and forest edges. In the woodlands on the Rondo Plateau the closely-related Western Violet-backed Sunbird is common (Tøttrup *et al.* 2005) and surprisingly this species was recorded in the open parts of the forest on Ndimba Hill (where Uluguru Violet-backed Sunbird appeared to be missing).

Plain-backed Sunbird *Anthreptes reichenowi*

This globally near-threatened sunbird (BirdLife International 2004) has two widely isolated, but not strongly differentiated, subspecies: the northern *yokanae* in coastal forests in Kenya and Tanzania, and the southern *reichenowi in* central-southern Mozambique, extending to south eastern Zimbabwe and South Africa (Fry *et al.* 2000).

In southeast Tanzania there are records from Namatimbili just north of Mitundumbea Forest south to Mikindani while it is unrecorded from the two northernmost studied forest sites; Kiwengoma and Kitope Forests. It is relatively common where present. In the southern part of its range it also occurs in *Brachystegia* woodland (Clancey 1971) as a possible breeding visitor (Fry *et al.* 2000) and recently it was also discovered in the dense *Brachylaena* woodlands and groundwater forest to the north of the East Usambaras, where it was abundant (Cordeiro & Githiru 1998, 2001). So far it has not been recorded from woodland habitats in southeast Tanzania although it is not confined to the forest interior or undisturbed forest as it has often been recorded from disturbed forest types, riparian forest and forest edges.

Discussion

The coastal forests on the partly-connected Rondo, Chitoa and Likonde–Ruawa Plateaus—in the following collectively referred to as the Lindi

Plateau Forests—stand out as the richest in terms of forest-dependent bird species compared to other forests in southeast Tanzania (Table 2). Collectively, the Lindi Plateau Forests are also the only sites between the Rufiji and Ruvuma Rivers where populations of Lemon Dove, Green-headed Oriole and Black-fronted Bush-shrike *Chlorophoneus nigrifrons* occur. These sedentary species are typically associated with highland forest in East Africa and their colonisation of the Lindi Plateau Forests with a maximum altitude of only 885 m is unexpected and suggests that past climatic conditions were significantly different.

Pleistocene climatic fluctuations are believed to have influenced many parts of Africa (Hamilton 1981) and are also believed to have affected the eco-climatic conditions in southeast Tanzania (Clarke 2000b). Periods of aridity are usually associated with the most recent glaciation and this has probably reduced and fragmented a formerly more contiguous forest cover along the Tanzania coast. The high species richness of the Lindi Plateau Forests and the occurrence of isolated relict populations of forests species suggest that these forests may have functioned as a refugium for lowland forest-dependent birds during such periods. The Lindi and Makonde Plateaus are the highest areas in southeast Tanzania but the Lindi Plateau probably receives the highest rainfall when the trade winds from the northeast bring moist air from the Indian Ocean. This is because the escarpments on the Lindi Plateau attract significant orographic precipitation while most of the highest ground of the Makonde plateau is in the rain-shadow of Lindi Plateau. As it is generally assumed that the trade winds did not change direction significantly during the last glaciation (Prell *et al.* 1980), a forest cover large enough to support forest-dependent birds seems most likely to have survived a dryer climate on the Lindi Plateau.

In addition to being a refugium for forest birds in southeast Tanzania during Pleistocene glaciations, the isolation of forest birds in the Lindi Plateau forests may also have led to differentiation. Two subspecies are endemic to the coastal forests between the Ruvuma and Rufiji Rivers: the subspecies *reichenowi* of the Forest Batis and the subspecies *hylophona* of Green Barbet. The subspecies *griseiceps* of Kretschmer's Longbill is a near-endemic limited to coastal forests in Tanzania south of the Rufiji and a single site on the coast of northern Mozambique (Baker & Baker 2002). Furthermore the Lindi Plateau Forests are the only known breeding area of the nominate form of Spotted Ground Thrush (Baker & Baker 2002). Assuming that during glaciations forest in southeast Tanzania was mainly limited to the Lindi Plateau it seems likely that the population divergence in these taxa occurred *in situ*. Its significance as a local centre of endemism is further emphasised by the recent discoveries of an undescribed species of endemic galago, three endemic forest reptiles and at least two endemic butterflies (Burgess 2000). The Lindi Plateau has also been identified as a local centre of endemism for vascular plants since the level of floristic

endemism in these forests is strikingly higher than in neighbouring areas, in spite of an apparent similarity in topography and vegetation (Clarke 2001).

Despite uneven knowledge of the forests dealt with in this paper, with some forests being more adequately surveyed than others (Table 1), we show that the richness of the forest avifauna and the occurrence of small populations of several species of conservation concern emphasise the importance of the Lindi Plateau Forests. All forests on the Lindi Plateau known to be important to birds are Forest Reserves and were recently designated as Important Birds Areas (Baker & Baker 2002). In spite of this, an increased conservation initiative in this area is urgently needed because in reality the forests are poorly protected from illegal cutting, charcoal exploitation and subsistence farming. The completion of the Mkapa bridge across the Rufiji River in 2003 is seen by many as a catalyst for accelerated development in the regions south of the river. However, major concerns have been raised that the establishment of reliable means of transport will lead to escalating illegal timber harvesting and forest degradation south of the Rufiji (Milledge 2004).

To enhance overall conservation activities in this area, we recommend that Mitundumbea Forest Reserve, Ngarama North and South Forest Reserves and Pindiro Forest Reserve receive additional ornithological investigations. Further studies of these little-known areas will provide important information to help preserve some of the last-remaining viable stands of coastal forest in southeast Tanzania.

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References

Bagger, J., Halberg, K. & Nnyiti, P.Y. 1990. *Observations of birds in Rondo and Litipo Forests, South East Tanzania.* Danish-Tanzanian ICBP Expedition Report. Zoological Museum, University of Copenhagen.

Baker, N.E. & Baker, E.M. 2002. *Important Bird Areas in Tanzania: A first inventory.* Dar Es Salaam: Wildlife Conservation Society of Tanzania.

Bennun, L.A. 1985. The Spotted Ground Thrush *Turdus fischeri* at Gede in coastal Kenya. *Scopus* 9: 97–107.

BirdLife International. 2004. *BirdLife's online World Bird Database: the site for bird conservation.* Version 2.0. Cambridge: BirdLife International (accessed 24 September 2004).

Britton, P.L. 1978. The Andersen collection from Tanzania. *Scopus* 2: 77–85.

Britton, P.L. (ed) 1980. *Birds of East Africa.* Nairobi: East African Natural History Society.

Britton, P.L. 1981. Notes on the Andersen collection and other specimens from Tanzania housed in some West German museums. *Scopus* 5: 14–21.

Brown, L.H., Urban, E.K. & Newman, K. (eds) 1982. *The birds of Africa.* Vol. I. London: Academic Press.

Burgess, N.D. 2000. Global importance and patterns in the distribution of Coastal Forest species. Pp. 235–248 *in* Burgess, N.D. & Clarke, G.P. (eds) *Coastal Forests of Eastern Africa.* Cambridge: IUCN.

Burgess, N.D. & Clarke, G.P. (eds) 2000. *Coastal Forests of Eastern Africa.* Cambridge: IUCN.

Burgess, N.D., Clarke, G.P., Madgwick, J., Robertson, S.A. & Dickinson, A. 2000. Distribution and status. Pp. 71–81 *in* Burgess, N.D. & Clarke, G.P. (eds) *Coastal Forests of Eastern Africa.* Cambridge: IUCN.

Burgess, N.D., Huxham, M.R., Mlingwa, C.O.F., Davies, S.G.F. & Cutts, C.J. 1991. Preliminary assessment of forest birds in Kiono, Pande, Kisiju and Kiwengoma coastal forests, Tanzania. *Scopus* 14: 97–106.

Clancey, P.A. 1971. *A handlist of the birds of southern Mozambique.* Lourenzo Marques: Instituto de Investigazao Cientifica de Mozambique.

Clancey, P.A. 1979. Miscellaneous taxonomic notes on African birds 55. *Durban Museum Novitates* 12: 47–61.

Clancey, P.A. & Lawson, W.J. 1969. A new race of White-breasted Alethe from Mozambique. *Bulletin of the British Ornithologists' Club* 89: 4–6.

Clarke, G.P. 1995. *Status Reports for 6 Coastal Forests in Lindi Region, Tanzania.* Frontier–Tanzania Technical Report No. 18. The Society for Environmental Exploration, U.K. and the University of Dar es Salaam, Tanzania.

Clarke, G.P. 2000a. Defining the eastern African Coastal Forests. Pp. 9–26 *in* Burgess, N.D. & Clarke, G.P. (eds) *Coastal Forests of Eastern Africa.* Cambridge: IUCN.

Clarke, G.P. 2000b. Climate and climatic history. Pp. 47–67 *in* Burgess, N.D. & Clarke, G.P. (eds) *Coastal Forests of Eastern Africa.* Cambridge: IUCN.

Clarke, G.P. 2001. The Lindi local centre of endemism in SE Tanzania. Pp. 1063–1072 *in* Robbrecht, E., Degreef, J. & Friis, I. (eds) *Plant systematics and phytogeography for the understanding of African biodiversity.* Proceedings of the XVIth AETFAT Congress, 2000, the National Botanic Garden of Belgium.

Clarke, G.P. & Karoma, N.J. 2000. History of anthropic disturbance. Pp. 251–261 *in* Burgess, N.D. & Clarke, G.P. (eds) *Coastal Forests of Eastern Africa.* Cambridge: IUCN.

Clarke, G.P., Vollesen, K. & Mwasumbi, L.B. 2000. Vascular plants. Pp. 129–147 *in* Burgess, N.D. & Clarke, G.P. (eds) *Coastal Forests of Eastern Africa.* Cambridge: IUCN.

Collar, N.J. & Stuart, S.N. 1985. *Threatened Birds of Africa and Related Islands.* Cambridge: International Council for Bird Preservation.

Collar, N.J., Crosby, M.J. & Stattersfield, A. 1994. *Birds to Watch 2: The World List of Threatened Birds.* BirdLife Conservation Series number 4. Cambridge: BirdLife International.

Cordeiro, N.J. & Githiru, M. 1998. Avifauna of the *Brachylaena* woodlands in the Usambara lowlands. *Bulletin African Bird Club* 5: 13–16.

Cordeiro, N.J. & Githiru, M. 2001. Birds of Mgambo Proposed Forest Reserve and other East Usambara lowland sites. *Scopus* 22: 37–47.

Eriksen, T., Halberg, K., Lemberg, T. & F.S. Petersen. 1994. *A survey of bird life in five Coastal Forests of south-eastern Tanzania 1993.* Copenhagen: BirdLife-Denmark, Zoological Institute, University of Copenhagen.

Evans, T.D. 1997. Records of birds from the forests of the East Usambara lowlands, Tanzania, August 1994–February 1995. *Scopus* 19: 92–108

Evans, T.D., Watson, L.G., Hipkiss, A.J., Kiure, J., Timmins, R.J. & Perkin, A.W. 1994. New records of Sokoke Scops Owl *Otus ireneae*, Usambara Eagle Owl *Bubo vosseleri*, and East Coast Akalat *Sheppardia gunningi* from Tanzania. *Scopus* 18: 40–47.

Faldborg, J., Halberg, K., Brammer, F., & Eriksen, T. 1991. *Observations of Birds and Mammals in six Coastal Forests of Tanzania.* Preliminary Report of the Danish ICBP Expedition 1990.

Fjeldså, J. 1999. The impact of human forest disturbance on the endemic avifauna of the Udzungwa Mountains, Tanzania. *Bird Conservation International* 9: 47–62.

Fjeldså, J. & Rabøl, J. 1995. Variation in avian communities between isolated units of the Eastern Arc Montane Forests, Tanzania. *Le Gerfaut* 85: 3–18.

Fjeldså, J., Howell, K. & Andersen, M. 1997. An ornithological visit to the Rubeho Mountains, Tanzania. *Scopus* 19: 73–82.

Fjeldså, J., Roy, M.S. & Kiure, J. 2000. A new montane subspecies of *Sheppardia gunningi* (East-coast Akalat) from Tanzania. *Bulletin of the British Ornithologists' Club* 120: 27–33.

Fottland, H. 1996. *Tanzania Forest Reserves, Status 1996.* Catchment Forest Report 96.8. Dar es Salaam: Division of Forestry and Beekeeping.

Fry, C.H., Keith, S. & Urban, E.K. (eds) 1988. *The Birds of Africa.* Vol. III. London: Academic Press.

Fry, C.H., Keith, S. & Urban, E.K. (eds) 2000. *The Birds of Africa.* Vol. VI. London: Academic Press.

Harris, T. & Franklin, K. 2000. *Shrikes & Bush-shrikes including wood-shrikes, helmet-shrikes, flycatcher-shrikes, philentomas, batises and wattle-eyes.* London: Christopher Helm.

Hamilton, A.C. 1981. The Quaternary history of African forests: its relevance to conservation. *African Journal of Ecology* 19: 1–6.

Holsten, B., Bräunlich, A. & Huxham, M. 1991. Rondo Forest Reserve, Tanzania: an ornithological note including new records of the East Coast Akalat *Sheppardia gunningi*, the Spotted Ground Thrush *Turdus fischeri*, and the Rondo Green Barbet *Stactolaema olivacea woodwardi*. *Scopus* 14: 125–128.

Jensen, F.P., Brøgger-Jensen, S. & Petersen, G. 1985. The White-chested Alethe *Alethe fuelleborni* in Tanzania. *Scopus* 9: 127–132.

Jones, J.M.B. 1999. To Mozambique for the nests of White-chested Alethe and Gunning's Robin. *Honeyguide* 45: 59–60.

Keith, S., Urban, E.K. & Fry, C.H. (eds) 1992. *The Birds of Africa.* Vol. IV. London: Academic Press.

Mackinnon, J. & Phillips, K. 1993. *The Birds of Borneo, Sumatra, Java, and Bali.* Oxford: Oxford University Press.

Mackworth-Praed, C.W. & Grant, C.H.B. 1960. *Birds of Eastern and North Eastern Africa.* Vol. II. London: Longman.

Milledge, S. 2004. Forests and timber trade in southeast Tanzania: What will be the legacy of Mkapa Bridge? *The Arc Journal* 16: 1 & 4–5.

Mlingwa, C.O.F., Waiyaki, E.M., Bennun, L.A. & Burgess, N.D. 2000. Birds. Pp. 149–171 *in* Burgess, N.D & Clarke, G.P. (eds) *Coastal Forests of Eastern Africa.* Cambridge: IUCN.

Moyer, D.C. 1993. A preliminary trial of territory mapping for estimating bird densities in Afromontane forests. *Proceedings of the Pan-African Ornithological Congress* 8: 302–311.

Nemeth, E. & Bennun, L. 2000. Distribution, habitat selection and behaviour of the East Coast Akalat *Sheppardia gunningi sokokensis* in Kenya and Tanzania. *Bird Conservation International* 10: 115–130.

Ornithological Sub-committee of the EANHS. 1996. *Checklist of birds of East Africa.* Nairobi: East African Natural History Society.

Pratt, D.J. & Gwynne, M.D. 1977. *Rangeland Management and Ecology in East Africa.* London: Hodder and Stoughton.

Prell, W.L., Hutson, W.H., Williams, D.F., Bé, A.W.H., Geitzenhauer, K. & Molfino, B. 1980. Surface circulation of the Indian Ocean during the last glacial maximum, approximately 18 000 yr BP. *Quaternary Research* 14: 309–336.

Romdal, T.S. 2001. Altitudinal distribution and abundance patterns of bird species in the Eastern Arc Mountains, Tanzania. *Scopus* 21: 35–54.

Seddon, N., Ekstrom, J.M., Capper, D.R., Isherwood, I.S., Muna, R., Pople, R., Tarimo, E. & Timothy, J. 1999. Notes on the ecology and conservation status of key bird species in Nilo and Nguu North Forest reserve, Tanzania. *Bird Conservation International* 9: 9–28.

Snow, D.W. (ed) 1978. *An Atlas of Speciation in African Non-Passerine Birds.* London: British Museum.

Stjernstedt, R. 1970. Birds in *Brachystegia microphyllum* in southern Tanzania. *Bulletin of the British Ornithologists' Club* 90: 28–31.

Stuart, S.N. & Jensen, F.P. 1981a. The avifauna of the Uluguru Mountains, Tanzania. *Le Gerfaut* 75: 155–197.

Stuart, S.N. & Jensen, F.P. 1981b. Further range extensions and other notable records of forest birds from Tanzania. *Scopus* 5: 106–115.

Stuart, S.N., Jensen, F.P. & Brøgger-Jensen, S. 1987. Altitudinal zonation of the avifauna in Mwanihana and Magombera Forests, eastern Tanzania. *Le Gerfaut* 77: 165–186.

Svendsen, J.O. & Hansen, L.A. 1995. *Report on The Uluguru Biodiversity Survey 1993.* Sandy: The Royal Society for the Protection of Birds, Danish Centre for Tropical Biodiversity and Tanzania Forestry Research Institute.

Tøttrup, A.P., Jensen, F.P. & Christensen, K.D. 2005. The avifauna of two woodlands in southeast Tanzania. *Scopus* 25: 23–36.

Urban, E.K., Fry, C.H. & Keith, S. (eds) 1997. *The birds of Africa.* Vol. V. San Diego: Academic Press.

Waiyaki, E. & Bennun, L.A. 2000. The avifauna of coastal forests in southern Kenya: status and conservation. *Ostrich* 71: 247–256.

Zimmerman, D.A., Turner, D.A. & Pearson, D.J. 1996. *Birds of Kenya and northern Tanzania.* London: Christopher Helm.

Flemming P. Jensen
DDH Consulting A/S, Ringstedvej 20, DK–4000 Roskilde, Denmark. Email: fpj@Hedeselskabet.dk
Anders P. Tøttrup*
Zoological Museum, University of Copenhagen, Universitetsparken 15, DK–2100 Copenhagen Ø, Denmark.
Kim D. Christensen
DDH Consulting A/S, Ringstedvej 20, DK–4000 Roskilde, Denmark. Email: kim@diget.dk

**Current address: Centre for Macroecology, Institute of Biology, University of Copenhagen Universitetsparken 15, DK–2100, Copenhagen Ø, Denmark. Email: aptottrup@bi.ku.dk*

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Appendix

Bird species recorded from 11 coastal forests south of the Rufiji River and around Mikindani, southeast Tanzania. See text for definition of forest dependency codes F and FF. Taxonomy and nomenclature follow Ornithological Sub-committee of the EANHS (1996) except for bush-shrikes where we follow Harris & Franklin (2000).

Forest sites and source of information on avifauna: MA = Matumbi Massif—Kiwengoma Forest Reserve: Burgess *et al.* 1991. KI = Kitope Hill—Kitope Forest: this study. MT = Mitundumbea Plateau—Namatimbili: this study. RU = Ruwuwa Plateau—Ngarama North and South Forest Reserves: Eriksen *et al.* 1994, this study. MB = Mbwalawala Plateau—Pindiro Forest: Eriksen *et al.* 1994. ND = Ndimba Hill—Ndimba Forest: N. Baker in litt., this study. RL = Ruawa-Likonde Plateau—Ruawa Forest Reserve: this study. CH = Chitoa Plateau—Chito Forest Reserve: Eriksen *et al.* 1994, this study. LI = Chitoa Plateau—Litipo Forest Reserve: Bagger *et al.*1990, Faldborg *et al.* 1991, Eriksen *et al.* 1994. RO = Rondo Plateau—Rondo Forest: Bagger *et al.* 1990, Faldborg *et al.* 1991, Holsten *et al.* 1991, Eriksen *et al.* 1994, Baker & Baker 2002, N. Baker in litt. MK = Makonde Plateau—Nyangarama Forest: Faldborg *et al.* 1991. MI = Mikindani: Britton 1978, Britton 1980, Britton 1981, specimens at the Zoological Museum in Copenhagen and the Naturalis Museum in Leiden.

		MA	KI	MT	RU	MB	ND	RL	CH	LI	RO	MK	MI
F	Southern Banded Snake Eagle *Circaetus fasciolatus*	X				X				X	X		
F	African Goshawk *Accipiter tachiro*	X	X	X	X	X	X	X	X	X	X	X	
F	Ayres's Hawk Eagle *Hieraaetus dubius*			X						X			
FF	Crowned Eagle *Stephanoaetus coronatus*	X	X	X	X	X			X		X	X	
	African Cuckoo Falcon *Aviceda cuculoides*					X		X			X		X
F	Bat Hawk *Macheiramphus alcinus*							X					
F	Crested Guineafowl *Guttera pucherani*	X		X	X	X				X	X	X	
FF	Lemon Dove *Aplopelia larvata*									X	X		
F	Tambourine Dove *Turtur tympanistria*	X	X	X	X	X	X	X	X	X	X		
	Emerald-spotted Wood Dove *Turtur chalcospilos*		X		X	X	X	X	X	X	X	X	
F	African Green Pigeon *Treron calva*				X	X					X		
	Brown-necked Parrot *Poicephalus robustus*		X	X	X	X	X	X	X	X	X	X	
F	Brown-headed Parrot *Poicephalus cryptoxanthus*	X			X	X	X		X	X	X		
F	Livingstone's Turaco *Tauraco livingstonii*	X	X	X	X		X	X	X	X	X		
	Violet-crested Turaco *Musophaga porphyreolopha*				X	X							
FF	Barred Long-tailed Cuckoo *Cercococcyx montanus*	X		X	X	X	X	X	X	X	X		X
	Didric Cuckoo *Chrysococcyx caprius*				X		X					X	
F	Emerald Cuckoo *Chrysococcyx cupreus*			X	X		X	X	X		X		X
	Klaas's Cuckoo *Chrysococcyx klaas*		X	X	X	X	X	X					X
	Asian Lesser Cuckoo *Cuculus poliocephalus*			X	X			X					
F	Yellowbill *Ceuthmochares aereus*		X	X	X	X	X			X	X		
	Spotted Eagle Owl *Bubo africanus*				X					X	X		
F	African Wood Owl *Strix woodfordii*	X	X	X	X	X	X	X	X	X	X	X	
F	Fiery-necked Nightjar *Caprimulgus pectoralis*				X	X					X	X	
F	Böhm's Spinetail *Neafrapus boehmi*			X	X	X				X	X	X	
F	Mottled-throated Spinetail *Telacanthura ussheri*			X	X	X	X	X		X	X		X
F	Narina's Trogon *Apaloderma narina*	X	X	X	X	X	X	X	X	X	X	X	X
	Brown-hooded Kingfisher *Halcyon albiventris*		X	X	X	X				X	X	X	
	Mangrove Kingfisher *Halcyon senegaloides*			X				X	X				X
	African Pygmy Kingfisher *Ispidina picta*	X	X	X	X			X	X	X	X		X

		MA	KI	MT	RU	MB	ND	RL	CH	LI	RO	MK	MI
	Broad-billed Roller *Eurystomus glaucurus*				X		X			X	X		X
	Green Wood-hoopoe *Phoeniculus purpureus*		X	X	X	X	X		X	X	X		
F	Trumpeter Hornbill *Ceratogymna bucinator*	X	X	X	X	X	X	X	X	X	X	X	X
	Crowned Hornbill *Tockus alboterminatus*		X	X	X	X	X	X	X	X	X	X	
F	White-eared Barbet *Stactolaema leucotis*	X	X										
FF	Green Barbet *Stactolaema olivacea*			X	X			X			X		
F	Yellow-rumped Tinkerbird *Pogoniulus bilineatus*	X	X	X	X	X	X	X	X	X	X		X
FF	Eastern Green Tinkerbird *Pogoniulus simplex*				X	X	X	X	X	X	X		
	Lesser Honeyguide *Indicator minor*				X	X	X		X		X		
	Pallid Honeyguide *Indicator meliphilus*		X										
	Scaly-throated Honeyguide *Indicator variegatus*			X					X		X		
F	Golden-tailed Woodpecker *Campethera albingoni*	X	X		X	X	X		X	X	X	X	X
	Little Spotted Woodpecker *Campethera cailliautii*	X			X	X	X		X	X	X	X	X
	Cardinal Woodpecker *Dendropicos fuscescens*		X	X	X	X			X	X	X	X	X
	Bearded Woodpecker *Dendropicos namaquus*									X			
FF	African Broadbill *Smithornis capensis*	X	X	X	X	X	X	X	X	X	X	X	X
FF	African Pitta *Pitta angolensis*	X		X	X		X	X	X	X	X		X
	Black Rough-wing Swallow *Psalidoprocne pristoptera*	X		X	X	X			X	X	X		X
	Black Cuckoo-shrike *Campephaga flava*		X		X	X	X		X	X	X	X	X
	Zanzibar Sombre Greenbul *Andropadus importunus*		X		X			X				X	
F	Little Greenbul *Andropadus virens*									X	X		
F	Yellow-bellied Greenbul *Chlorocichla flaviventris*	X	X	X	X	X	X		X	X	X	X	
F	Eastern Nicator *Nicator gularis*	X	X	X	X	X	X	X	X	X	X	X	
FF	Tiny Greenbul *Phyllastrephus debilis*	X	X	X	X	X	X	X	X	X	X		
FF	Fischer's Greenbul *Phyllastrephus fischeri*	X	X	X	X	X	X	X	X	X	X		X
FF	Yellow-streaked Greenbul *Phyllastrephus flavostriatus*	X	X	X	X	X	X	X	X	X	X		X
F	Terrestrial Brownbul *Phyllastrephus terrestris*		X		X			X		X			
FF	White-chested Alethe Alethe fuelleborni								X				
	Eastern Bearded Scrub Robin *Cercotrichas quadrivirgata*	X	X		X	X	X		X	X	X	X	
	White-browed Robin Chat *Cossypha heuglini*				X								X
F	Red-capped Robin Chat *Cossypha natalensis*	X	X	X	X	X	X	X	X	X	X		X
FF	Red-tailed Ant Thrush *Neocossyphus rufus*	X	X	X	X	X	X	X	X	X	X		X
FF	East Coast Akalat *Sheppardia gunningi*							X	X	X	X		
FF	Spotted Ground Thrush *Zoothera fischeri*									X	X		
	Kurrichane Thrush *Turdus libonyanus*				X	X							X
F	Ashy Flycatcher *Muscicapa caerulescens*		X		X				X	X			X
	Yellow-breasted Apalis *Apalis flavida*		X	X	X	X	X	X	X	X	X	X	
FF	Black-headed Apalis *Apalis melanocephala*				X					X	X		
	Grey-backed Camaroptera *Camaroptera brachyura*	X	X	X	X	X	X	X	X	X	X	X	
	Tawny-flanked Prinia *Prinia subflava*		X		X					X	X	X	
FF	Kretschmer's Longbill *Macrosphenus kretschmeri*	X								X	X		X
F	Yellow White-eye *Zosterops senegalensis*			X		X					X		
	Black-and-White Flycatcher *Bias musicus*	X	X		X	X			X	X	X		X
F	Black-throated Wattle-eye *Platysteira peltata*		X	X	X	X				X	X	X	X
	Livingstone's Flycatcher *Erythrocercus livingstonei*		X		X	X	X	X	X	X	X	X	X
	African Paradise Flycatcher *Terpsiphone viridis*					X				X	X		
FF	Blue-mantled Crested Flycatcher *Trochocercus cyanomelas*	X	X	X	X	X	X	X	X	X	X	X	X
F	East Coast Batis *Batis soror*				X	X			X		X		
FF	Forest Batis *Batis mixta*		X	X	X	X	X	X	X	X	X	X	X
	Retz's Helmet-shrike *Prionops retzii*		X		X		X				X	X	
F	Chestnut-fronted Helmet-shrike *Prionops scopifrons*	X	X	X	X	X	X			X	X		X
F	Black-backed Puffback *Dryoscopus cubla*	X	X	X	X	X	X	X	X	X	X	X	
	Tropical Boubou *Laniarius ferrugineus*	X	X	X	X	X	X		X	X	X	X	

		MA	KI	MT	RU	MB	ND	RL	CH	LI	RO	MK	MI
F	Four-coloured Bush-shrike *Chlorophoneus viridis*	X	X		X	X	X	X	X	X	X	X	X
FF	Black-fronted Bush-shrike *Chlorophoneus nigrifrons*		X								X		
F	Square-tailed Drongo *Dicrurus ludwigii*	X	X	X	X	X	X	X	X	X	X	X	X
	African Golden Oriole *Oriolus auratus*				X	X				X	X		X
	Black-headed Oriole *Oriolus larvatus*					X					X		X
F	Green-headed Oriole *Oriolus chlorocephalus*										X		
	Violet-backed Starling *Cinnyricinclus leucogaster*				X		X				X		X
F	Black-breasted Glossy Starling *Lamprotornis corruscus*	X		X	X		X	X	X	X	X		X
F	Collared Sunbird *Anthreptes collaris*	X	X	X	X	X	X	X	X	X	X	X	
F	Uluguru Violet-backed Sunbird *Anthreptes neglectus*	X	X	X	X	X		X	X	X	X		X
	Western Violet-backed Sunbird *Anthreptes longuemarei*						X						
FF	Plain-backed Sunbird *Anthreptes reichenowi*			X	X	X	X	X	X	X	X	X	X
FF	Olive Sunbird *Nectarinia olivacea*	X	X	X	X	X	X	X	X	X	X		X
	Mouse-coloured Sunbird *Nectarinia veroxii*		X		X		X			X			X
F	Dark-backed Weaver *Ploceus bicolor*	X	X	X	X	X	X	X	X	X	X	X	X
F	Peter's Twinspot *Hypargos niveoguttatus*	X	X		X	X	X	X	X	X	X	X	X
FF	Green-backed Twinspot *Mandingoa nitidula*	X			X	X	X		X	X	X		

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The avifauna of two woodlands in southeast Tanzania

Anders P. Tøttrup, Flemming P. Jensen and Kim D. Christensen

In Tanzania *Brachystegia* or miombo woodland occupies about two-thirds of the country including the central plateau to the north and the south eastern plateau (Lind & Morrison 1974). Along the coast more luxuriant woodlands are found in what White (1983) terms the "Zanzibar-Inhambane regional mosaic" floristic region. This highly complex vegetation comprises unique types of forest, thicket, woodland, bushland and grassland, interspersed with areas presently under cultivation and fallow (Hawthorne 1993). The coastal woodlands are usually deciduous or semi-deciduous but contain some evergreen species and often merge with coastal thickets, scrub forest and coastal forest (Hawthorne 1993, Vollesen 1994).

The avifauna of miombo woodlands has been described for Zambia (e.g. Benson & Irwin 1966) and Zimbabwe (e.g. Vernon 1968, 1984, 1985), while little has been published on the birds of the coastal woodlands. An exception is Stjernstedt (1970) who reported on the birds in lush and dense *Brachystegia microphylla* vegetation in a "sea of miombo" in southeast Tanzania. Here we report our observations of birds in two woodlands in coastal southeast Tanzania, one of which harboured miombo trees. We present information on the number of species encountered during the fieldwork, and compare the avifauna of the two sites. We discuss possible causes for the differences observed and provide new information on habitat preferences for some of the species we recorded at these sites.

Study sites

Field work was carried out in two coastal woodlands in the Lindi Region, southeast Tanzania in September and October 2001. Mean annual rainfall in this region ranges between 800 and 1200 mm. Rains of short duration occurs from November to December, while longer rains extend from February/March to April/May. This is followed by a dry period lasting up to six months (Werger & Coetzee 1978).

Mihima

The Mihima study site (10°12'S, 39°08'E) was located *c.* 4.5 km north of the village of Mihima on the western part of the Rondo Plateau west of Rondo Forest Reserve at an elevation of 600 m (Figure 1). The Rondo Forest Reserve

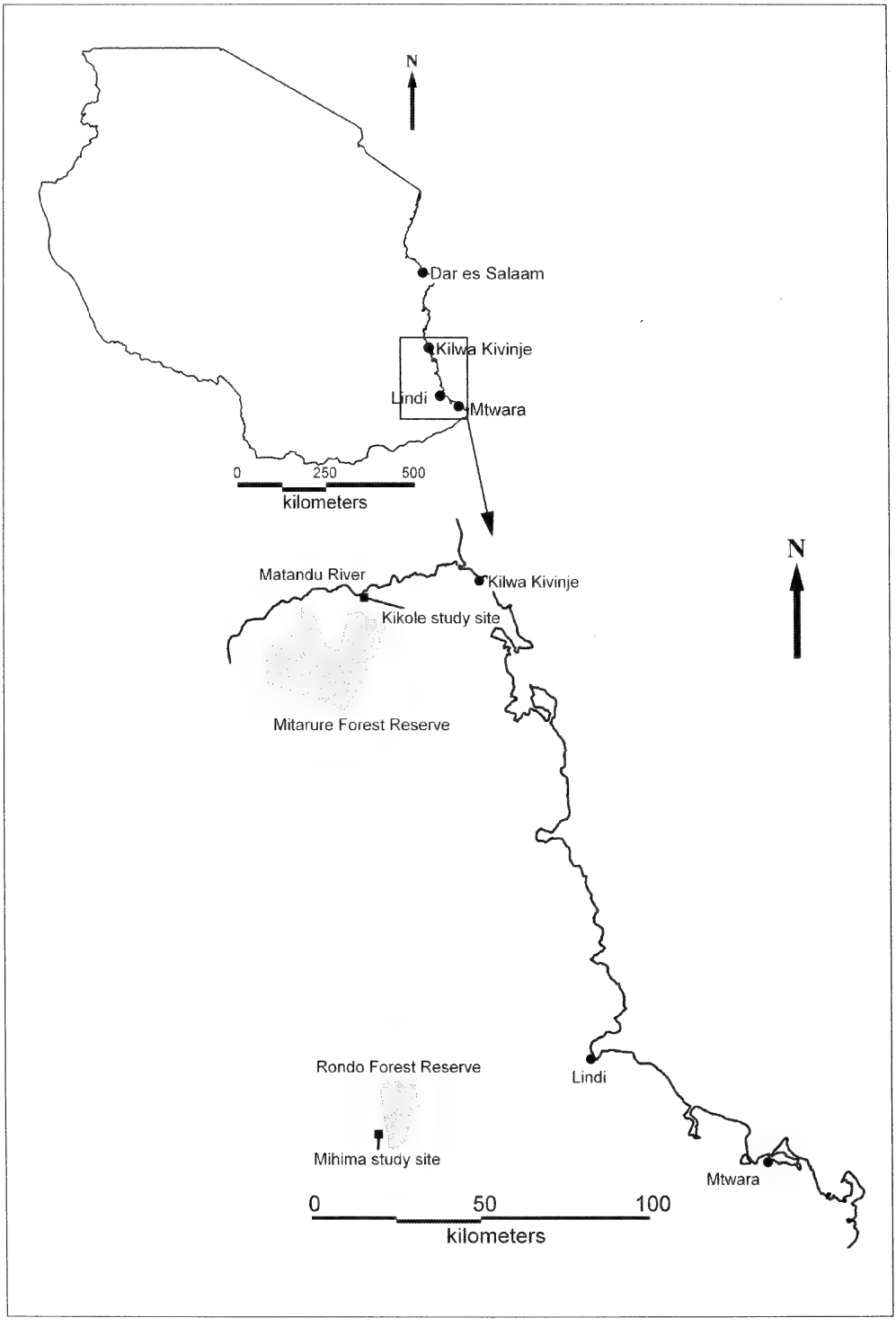

Figure 1. Location of the two coastal woodland study sites in Lindi Region, southeast Tanzania.

is mainly known for its forest, which contains a far greater number of endemic plant species than any other coastal forest in eastern Africa (Burgess & Clarke 2000). However, the western part of the plateau (including the survey area of this study) is covered with woodland, thickets, grasslands and other open vegetation types. The vegetation of the study site was dominated by rather open woodland with only a few large trees reaching a height of 10–15 m. Dense grassy vegetation mixed with patches of shrub and thickets covered the woodland floor. Common trees were *Parinari curatellifolia, Brachystegia microphylla, Pterocarpus angolensis* and *Strychnos panganiensis*, all of which are widespread in woodland vegetations of coastal Tanzania (Burgess & Clarke 2000). The study site was heavily used by the local human population. Many large trees were recently cut down and there were widespread signs of intensive pole cutting. Part of the study area was recently burned and it seems likely that the entire woodland area is burned annually. Wild animals seemed few with Yellow Baboon *Papio cynocephalus* being the only large wild mammal recorded during the field study.

Kikole

The Kikole study site (08°48'S, 39°06'E) was located near Kikole village approximately 30 km west of Kilwa Kivinje (Figure 1). This study site at 110 m elevation was situated just north of the large Mitarura Forest Reserve. The area consisted of relatively dry ridges and damper depressions. The Matandu River, with associated moist thickets, is situated a few kilometres from the study site. The vegetation consisted of well-developed woodland with stands of trees reaching a height of 10–15 m with the crowns just touching to form a closed canopy. The ground flora consisted of a large variety of small shrubs, herbs and many grasses. Dominant tree species were *Lannea stuhlmannii, Kigelia africana, Maprounea africana, Markhamia obtusifolia* and *Salvarora persica.* Shrubs were mainly *Millettia stuhlmannii, Dalbergia melanoxylon, Sclerocarya birrea, Pteleopsis myrtifolia* and *Combretum zeyheri.* Large parts of the woodlands were burned annually but otherwise the vegetation showed almost no signs of human impact. The density of wild animals was high and included several species of monkeys, large carnivores as well as ungulates such as Bush Pig *Potamochoerus larvatus*, Bushbuck *Tragelaphus scriptus* and Waterbuck *Kobus ellipsiprymnus.*

Methods

Field work was carried out at the Mihima site from 22–27 September 2001 and at the Kikole site from 18–23 October 2001. To assess the species richness at each site we conducted random walks within a specific study area of 1.5–2 km^2, following the method described by Fjeldså (1999). Standardised field observations were conducted by two people and initiated at sunrise and were carried out continuously throughout the day

for six days at both Mihima and Kikole. We recorded all bird species and their abundances, considering each observation (species and number of individuals) as one sample. Birds flying overhead were included if they were specifically associated with the habitat (e.g. swallows and raptors actively foraging in the area). Birds that were simply passing through were excluded.

To detect elusive ground-dwelling species, mist-nets were operated in the densest parts of the study sites. Our total trapping effort at Mihima and Kikole was 2160 and 1080 net-metre-hours, respectively. Species only recorded through trapping or outside the standardised observations were added to the total species list, but not included in the species richness analyses.

In this study, we have chosen Jackknife1 and Chao2 to estimate species richness because they have been shown to perform well on bird communities (Walther & Martin 2001). Species richness estimates were produced with EstimateS software (Colwell 2000). To compare the species diversity found at the two sites, we chose the Simpson Index (1/D) and Simpson Evenness ($E_{1/D}$).

From our collected samples we computed rarefaction curves (100 randomisations, without replacement) for the two sites using EstimateS software (Colwell 2000). The resulting rarefaction curve can be viewed as the statistical expectation of the corresponding empirical species accumulation curve (Gotelli & Colwell 2001). To compare the community species diversity at the two study sites we added 95 % confidence limits to the upper rarefaction curve (Magurran 2004).

Species recorded were ranked according to their abundances and the rank abundance patterns at the two sites were compared. To test whether the abundance curves from the two sites were different, we used a Kolmogorov-Smirnov two-sample test (SAS 2000).

We follow the nomenclature of The Birds of Africa (Brown *et al.* 1982, Urban *et al.* 1986, Fry *et al.* 1988, Keith *et al.* 1992, Urban *et al.* 1997, Fry & Keith 2000, Fry & Keith 2004), except in three cases where we follow Stevenson & Fanshawe (2002) in recognising Black-chested Snake Eagle *Circaetus pectoralis* as a separate species and use the common names Grey-backed Camaroptera for *Camaroptera brachyura*, and Southern Cordon-Bleu for *Uraeginthus angolensis*. Furthermore, following Bennun *et al.* (1996) we categorised birds into two forest-dependent groupings: Forest Generalists (species that breed in the forest interior as well as secondary forest vegetation) and Forest Specialists (species that breed primarily in the interior of forests).

Results

A total of 1179 records (samples) of 1855 individuals were collected at Mihima and 1107 records (samples) of 2075 individuals were recorded at

Kikole. Our trapping effort resulted in 82 and 30 mist-netted individual birds at Mihima and Kikole respectively.

Species richness and diversity

We recorded a total of 141 species within the two study sites combined, of which 67 species were observed at both sites (Appendix). This total includes two Palaearctic migrants on passage (European Bee-eater *Merops apiaster* and Eurasian Golden Oriole *Oriolus oriolus).*

The total number of species recorded and the observed species richness were higher at Kikole (111 and 109 species) than Mihima (97 and 93 species). The species richness estimates confirm this result. Kikole seems to be more species rich (131–135 species) than Mihima (116–117 species), while the Simpson's index shows higher diversity and evenness at the Kikole site compared to Mihima (Table 1).

Table 1. Summary statistics from the Mihima and Kikole study sites.The total number of recorded species includes species mist-netted and those recorded outside the standardised random walks.The observed species richness includes species recorded during random walks only. Numbers in parenthesis are standard deviations.

	Mihima	Kikole
Total number of species recorded	97	111
Observed species richness	93	109
Estimated species richness, Chao2	117 (±17.5)	131 (±12.5)
Estimated species richness, Jacknife1	116 (±4.6)	135 (±5.0)
Simpson Index (1/D)	28.0 (±0.05)	34.8 (±0.03)
Simpson Evenness ($E_{1/D}$)	0.30	0.32

The rarefaction curves for the two study sites do not seem to reach an asymptote indicating that more observations are needed for a full comparison of the two sites (Figure 2). However, the lower curve (Mihima) lies outside of the 95 % confidence limits of the Kikole curve indicating that the two communities differ in diversity.

Although the patterns found in the ranked abundance curves (Figure 3) of the two study sites are not statistically different ($p = 0.06$, $n = 91$) they do indicate that Mihima is dominated by relatively few very common species while Kikole has a larger number of abundant species. Both curves show long tails of rare species; however, Kikole has a higher abundance of middle-ranking species. The difference in species composition is further indicated by the 15 most abundant species at each of the two study sites (Table 2). Of these most frequently recorded birds only seven species were shared by the two sites: Emerald-spotted Wood Dove *Turtur chalcospilos,* Common Bulbul *Pycnonotus barbatus,* East Coast Batis *Batis soror,* Black-backed Puffback *Dryoscopus cubla,* Eastern Black-headed Oriole *Oriolus larvatus,* Common Drongo *Dicrurus adsimilis* and Violet-backed Starling *Cinnyricinclus leucogaster.*

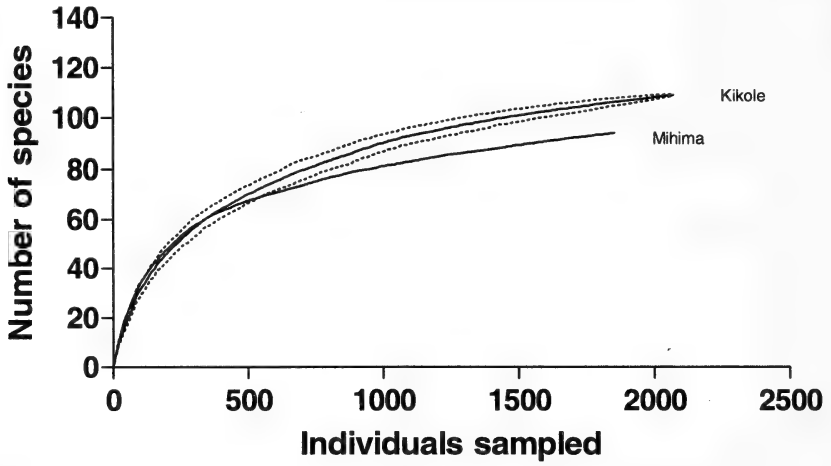

Figure 2. Species richness at the Mihima (lower line) and Kikole (upper line) study sites described by rarefaction curves. 95 % confidence limits (dotted lines) have been added to the rarefaction curve for Kikole.

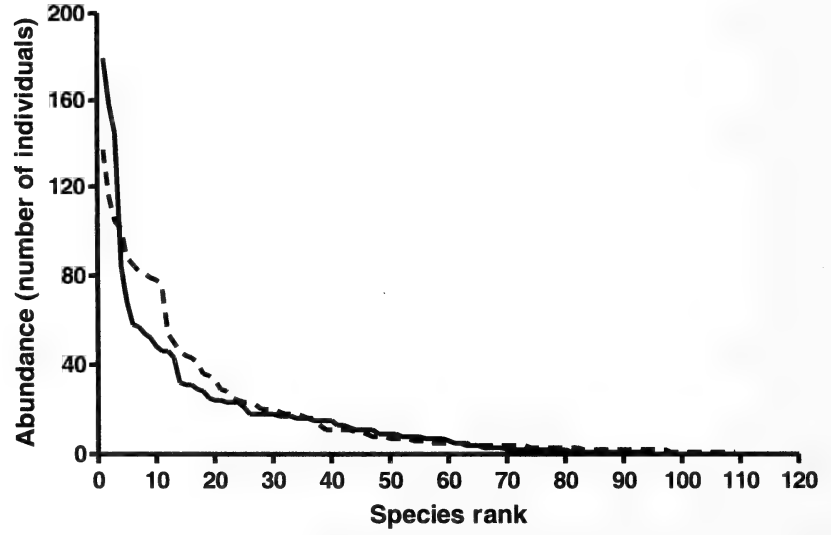

Figure 3. Ranked abundance curve with lines representing the ranked abundance distributions for Mihima (solid line) and Kikole (dotted line).

Notes on particular species

Two birds of conservation concern were recorded during this study and a number of birds were previously unrecorded from southeast Tanzania. (Urban *et al.* 1997, Fry & Keith 2000, Stevenson & Fanshawe 2002).

Southern Banded Snake Eagle *Circaetus fasciolatus* was recorded on 28 September 2001 at Mihima. It was probably a visitor from the closed forest in Rondo Forest Reserve. This species is considered to be near-threatened (IUCN 2004).

Stierling's Woodpecker ***Dendropicos stierlingi*** was recorded relatively commonly at Mihima with six records in six days: five observations of single birds and one of a pair. A few records from the southwest of Selous Game Reserve (Baker & Baker 2002) seem to be the only other published records of this rare low-density miombo woodland endemic from southeast Tanzania. This species is considered to be near-threatened (IUCN 2004).

Miombo Wren-Warbler ***Calamonastes undosus stierlingi*** was recorded six times at Mihima and one individual was mist-netted at Mihima on 27 September 2001. All observations were of single birds.

Yellow-bellied Eremomela ***Eremomela icteropygialis*** was a common bird in woodland at Mihima and recorded every day, usually in pairs or as members of mixed bird parties.

Red-faced Crombec ***Sylvietta whytii*** was another common member of mixed bird parties at Mihima. Most observations were of pairs and it often occurred in parties, which also included Yellow-bellied Eremomela. It was also recorded at Kikole but in smaller numbers.

Southern Black Flycatcher ***Melaenornis pammelaina*** was observed in low numbers in the woodlands at Kikole.

African Grey Flycatcher ***Melaenornis microrhynchus*** was found in low density at Kikole and more commonly at Mihima. Although usually a bird of open thorn bush and dry bushland it also occurs in woodland where it is mainly found in clearings and secondary growth (Britton 1980). At Mihima this species was recorded together with Pale Flycatcher *Melaenornis pallidus* but in smaller numbers and restricted to the most open parts of the vegetation.

Shelley's Sunbird ***Cinnyris shellyi*** was recorded four times at Mihima.

Table 2. The 15 most abundant species at each of the two study sites. The birds are arranged in descending order. Species appearing in both lists are shown in bold.

Mihima	Kikole
Amethyst Sunbird	Crowned Hornbill
East Coast Batis	Helmeted Guineafowl
Common Bulbul	Retz's Helmet Shrike
Eastern Black-headed Oriole	**Emerald-spotted Wood Dove**
Piping Cisticola	**Common Drongo**
Violet-backed Starling	**Eastern Black-headed Oriole**
Common Drongo	Green Wood Hoopoe
Emerald-spotted Wood Dove	Village Weaver
Yellow-fronted Tinkerbird	**Common Bulbul**
Yellow-bellied Hyliota	**Violet-backed Starling**
Yellow White-eye	Ring-necked Dove
Black-backed Puff-back	Little Purple-banded Sunbird
Tawny-flanked Prinia	**East Coast Batis**
Yellow-fronted Canary	Red-eyed Dove
Red-faced Crombec	Little Bee-eater

White Helmet-Shrike ***Prionops plumatus*** was regularly observed in small flocks at both sites and two individuals were mist-netted at Mihima on 23 September 2001.

Discussion

Many bird species found in woodland in Tanzania have a wide distribution in eastern and southern Africa. We investigated the avifauna of what appeared to be two rather similar coastal woodlands from the same region of Tanzania and found comparatively different species richness and diversity at the two sites. We also observed several species previously unrecorded from southeast Tanzania.

Our results clearly indicate that the coastal woodlands of south eastern Tanzania contain a surprisingly diverse avifauna with species associated with a wide range of habitats. The species diversity was higher at Kikole then Mihima and we found marked differences with regard to species composition in the two areas. Only 67 out of 141 species were observed at both sites and only seven out of the 15 most abundant species were found at both sites. These results might be due to insufficient data collection or a difference in climate (time of year for data collection and altitude of study site differed slightly). However, the occurrence of typical miombo woodland species such as Stierling's Woodpecker, Yellow-bellied Hyliota *Hyliota flavigaster* and Shelley's Sunbird at Mihima but not at Kikole also point to a stronger link to the presence of miombo at Mihima. On the other hand, the proximity of the sea at Kikole most likely explains the occurrence of Yellow-bellied Greenbul *Chlorocichla flaviventris* and Fischer's Greenbul *Phyllastrephus fischeri* mainly associated with coastal thickets and forest.

The woodland at Kikole was clearly less damaged by human activity (burning and logging) and contained a higher number of large trees than Mihima. The structurally more diverse and richer vegetation found at Kikole was likely to account for the higher species richness and diversity found at this site compared to Mihima. The more homogeneous habitat at Mihima, partly attributable to regular burning of the understorey, might explain the abundance pattern in birds. Only a few very common species are adapted to this environment compared to Kikole which had a higher number of common and rare species. This suggests that frequent burning and logging influence the species richness and diversity of coastal woodland vegetations as habitats for birds.

Most of the bird species recorded at the two study sites are widespread in different types of woodland (Britton 1980). However, over one fifth of the species recorded are listed as forest-dependent (Forest Specialists or Forest Generalists, *sensu* Bennun *et al.* 1996). The proximity of large tracts of closed forest near the study site at Mihima probably explains why the highest number of Forest Specialists was recorded there. The number of Forest Generalists, however, is almost the same at the two sites and indicates that a

number of forest-dependent species are able to penetrate far into woodland areas for at least part of the year.

African Broadbill *Smithornis capensis* is one of the Forest Specialists recorded from both study sites. We found this species very hard to detect during the standardised field observations because of its unobtrusive behaviour. However, when the males started to 'sing' while performing display flights just before sunrise, we discovered that the species was surprisingly common. Stjernstedt (1970) also recorded this species in woodland at Liwale approximately 150 km northwest of Mihima. This suggests that although primarily a forest bird in most parts of its range, it is also widespread in woodlands with dense thickets in southeast Tanzania. The many singing males recorded in September, which is shortly before the onset of the rains and the breeding season (Brown & Britton 1980), suggest that some of these birds may stay in woodland to breed.

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References

Baker, N.E. & Baker, E.M. 2002. *Important Bird Areas in Tanzania: A first inventory.* Dar es Salaam: Wildlife Conservation Society of Tanzania.

Bennun, L.A., Dranzoa, C. & Pomeroy, D.E. 1996. The Forest Birds of Kenya and Uganda. *Journal of East African Natural History Society* 85: 23–48

Benson, C.W. & Irwin, M.P.S. 1966. The *Brachystegia* avifauna. *Ostrich* 37: 297–321.

Britton, P.L. (ed) 1980. *Birds of East Africa: their habitat, status and distribution.* Nairobi: East Africa National History Society.

Brown, L.H. & Britton, P.L. 1980. *The Breeding Seasons of East African Birds.* Nairobi: The East African Natural History Society.

Brown, L.H., Urban, E.K. & Newman, K. (eds) 1982. *The Birds of Africa.* Vol. I. London: Academic Press.

Burgess, N.D. & Clarke, G. P. 2000. *Biodiversity and conservation of the coastal forests of eastern Africa.* Gland and Cambridge: IUCN.

Colwell, R.K. 2000. EstimateS: *Statistical estimation of species richness and shared species from samples.* Version 6.0b1. http://viceroy.eeb.uconn.edu/estimates

Fjeldså, J. 1999. The impact of human forest disturbance on the endemic avifauna of the Udzungwa Mountains, Tanzania. *Bird Conservation International* 9: 47–62.

Fry, C.H., Keith, S. & Urban, E.K (eds) 1988. *The Birds of Africa.* Vol. III. London: Academic Press.

Fry, C.H. & Keith, S. (eds) 2000. *The birds of Africa.* Vol. VI. London: Academic Press.

Fry, C.H. & Keith, S. (eds) 2004. *The birds of Africa.* Vol. VII. London: Christopher Helm.

Gotelli, N.J. & Colwell, R.K. 2001. Quantifying biodiversity: procedures and pitfalls in the measurement and comparison of species richness. *Ecology Letters* 4: 379–391.

IUCN. 2004. *2004 IUCN Red List of Threatened Species.* (www.redlist.org).

Keith, S., Urban, E.K. & Fry, C.H. (eds) 1992. *The birds of Africa.* Vol. IV. London: Academic Press.

Hawthorne, W.D. 1993. East African coastal forest botany. Pp. 57–103 *in* Lovett, J.C. & Wasser, S.K. (eds) *Biogeography and ecology of the rain forests of Eastern Africa.* Cambridge: Cambridge University Press.

Lind, E.M. & Morrison, M.E.S. 1974. *East African Vegetation.* London: Longman.

Magurran, A.E. 2004. *Measuring biological diversity.* Malden, Oxford & Carleton: Blackwell Publishing.

SAS. 2000. SAS version 8.02, SAS Institute Inc., Cary, NC, USA.

Stevenson, T. & Fanshawe, J. 2002. *Field guide to the Birds of East Africa.* London: T. & A. D. Poyser.

Stjernstedt, R. 1970. Birds in *Brachystegia microphyllum* in southern Tanzania. *Bulletin of British Ornithologists Club* 90: 2–31.

Urban, E.K., Fry, C.H. & Keith, S. (eds) 1986. *The birds of Africa.* Vol. II. London: Academic Press.

Urban, E.K., Fry, C.H. & Keith, S. (eds) 1997. *The birds of Africa.* Vol. V. London: Academic Press.

Vernon, C.J. 1968. A year's census of Marandellas, Rhodesia. *Ostrich* 39: 12–24.

Vernon, C.J. 1984. Population dynamics of birds in *Brachystegia* woodland. Pp. 201–216 *in* Ledger J.A. (ed) *Proceedings of the 5th Pan-African Ornithological Congress.* Johannesburg: Southern African Ornithological Society.

Vernon, C.J. 1985. Bird populations in two woodlands near Lake Kyle, Zimbabwe. *Honeyguide* 31: 148–161.

Vollesen, K. 1994. Rondo Plateau, Tanzania. Pp. 225–226 *in* Haywood V.H. & Davis S.D. (eds) *Centres of Plant Diversity. A Guide and strategy for their Conservation.* Vol. I. Cambridge: IUCN.

Walther, B.A. & Martin, J. 2001. Species richness estimation of bird communities: how to control for sampling effort. *Ibis* 143: 413–419.

Werger, M.J.A. & Coetzee, B.J. 1978. The Sudano-Zambezian Region. Pp. 301–462 *in* Werger, M.J.A. (ed) *Biogeography and Ecology of Southern Africa.* The Hague: W. Junk.

White, F. 1983. *The vegetation of Africa: a descriptive memoir to accompany the UNESCO/AETFAT/UNSO vegetation map of Africa.* Paris: UNESCO.

Anders P. Tøttrup*
Zoological Museum, University of Copenhagen, Universitetsparken 15, DK-2100 Copenhagen Ø, Denmark.
Flemming P. Jensen
DDH Consulting A/S, Ringstedvej 20, DK-4000 Roskilde, Denmark. E-mail: fpj@hedeselskabet.dk

Kim D. Christensen
DDH Consulting A/S, Ringstedvej 20, DK-4000 Roskilde, Denmark. E-mail: kim@diget.dk

**Current address: Centre for Macroecology, Institute of Biology, University of Copenhagen Universitetsparken 15, DK–2100, Copenhagen Ø, Denmark. Email: aptottrup@bi.ku.dk*

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Appendix

Bird species recorded at the two coastal woodland sites. FF = Forest Specialists and F = Forest Generalists following Bennun *et al.* (1996). Number of records is followed by the total number of individuals observed at the each site in parentheses. "x" indicates that the species was recorded from the woodland outside the systematic field survey.

English name	Scientific name	Forest dependence	Mihima	Kikole
Marabou Stork	*Leptoptilos crumeniferus*	-		1 (1)
African White-backed Vulture	*Gyps africanus*	-		12 (36)
Black-chested Snake Eagle	*Circaetus pectoralis*	-	3 (3)	
Southern Banded Snake Eagle	*Circaetus fasciolatus*	F	1 (1)	
Bateleur	*Terathopius ecaudatus*	-	3 (3)	14 (16)
African Harrier Hawk	*Polyboroides typus*	-	1 (1)	
Gabar Goshawk	*Micronisus gabar*	-		2 (2)
Dark Chanting Goshawk	*Melierax metabates*	-	1 (1)	1 (2)
African Goshawk	*Accipiter tachiro*	F		1 (1)
African Little Sparrowhawk	*Accipiter minullus*	-		3 (3)
Lizard Buzzard	*Kaupifalco monogrammicus*	-	1 (1)	2 (2)
Wahlberg's Eagle	*Aquila wahlbergi*	-		3 (3)
African Hawk Eagle	*Hieraaetus spilogaster*	-		1 (2)
Crowned Eagle	*Stephanoaetus coronatus*	FF	x	
Helmeted Guineafowl	*Numida meleagris*	-		7 (115)
Coqui Francolin	*Francolinus coqui*	-	1 (2)	
Crested Francolin	*Francolinus sephaena*	-		11 (17)
African Green Pigeon	*Treron calva*	F	10 (24)	4 (5)
Blue-spotted Wood Dove	*Turtur afer*	-		3 (3)
Emerald-spotted Wood Dove	*Turtur chalcospilos*	-	47 (54)	77 (101)
Red-eyed Dove	*Streptopelia semitorquata*	-		37 (46)
Ring-necked Dove	*Streptopelia capicola*	-	2 (2)	61 (76)
Laughing Dove	*Streptopelia senegalensis*	-		1 (2)
Brown-necked Parrot	*Poicephalus robustus*	-	14 (28)	11 (28)
Brown-headed Parrot	*Poicephalus cryptoxanthus*	F		12 (24)
Violet-crested Turaco	*Musophaga porphyreolopha*	-	7 (7)	7 (11)
Thick-billed Cuckoo	*Pachycoccyx audeberti*	-	1 (1)	
African Cuckoo	*Cuculus gularis*	-		2 (2)
Klaas's Cuckoo	*Chrysococcyx klaas*	-	2 (2)	3 (3)
White-browed Coucal	*Centropus superciliosus*	-		2 (2)

Spotted Eagle-Owl	*Bubo africanus*	-	1 (1)	
African Wood Owl	*Strix woodfordii*	F	1 (1)	x
Fiery-necked Nightjar	*Caprimulgus pectoralis*	F	1 (2)	
Mottled Spinetail	*Telacanthura ussheri*	F		1 (1)
Böhm's Spinetail	*Neafrapus boehmi*	F		1 (2)
African Palm Swift	*Cypsiurus parvus*	-		1 (4)
Brown-hooded Kingfisher	*Halcyon albiventris*	-		7 (8)
Grey-headed Kingfisher	*Halcyon leucocephala*	-		1 (1)
Striped Kingfisher	*Halcyon chelicuti*	-	x	2 (2)
Little Bee-eater	*Merops pusillus*	-	1 (2)	29 (44)
Swallow-tailed Bee-eater	*Merops hirundineus*	-	11 (15)	6 (7)
White-fronted Bee-eater	*Merops bullockoides*	-		3 (4)
European Bee-eater	*Merops apiaster*	-	3 (5)	3 (10)
Lilac-breasted Roller	*Coracias caudate*	-		1 (2)
Broad-billed Roller	*Eurystomus glaucurus*	-		10 (13)
Green Wood-Hoopoe	*Phoeniculus purpureus*	-	5 (17)	29 (82)
Scimitarbill	*Phoeniculus cyanomelas*	-	11 (18)	12 (16)
Hoopoe	*Upupa epops*	-	1 (1)	
Southern Ground Hornbill	*Bucorvus cafer*	-		7 (10)
Crowned Hornbill	*Tockus alboterminatus*	-	1 (1)	62 (137)
African Grey Hornbill	*Tockus nasutus*	-		2 (11)
Trumpeter Hornbill	*Ceratogymna bucinator*	F	6 (8)	17 (5)
Green Tinkerbird	*Pogoniulus simplex*	FF	10 (11)	
Yellow-rumped Tinkerbird	*Pogoniulus bilineatus*	F	30 (31)	1 (1)
Yellow-fronted Tinkerbird	*Pogoniulus chrysoconus*	-	46 (52)	18 (19)
Brown-breasted Barbet	*Lybius melanopterus*	-		2 (3)
Crested Barbet	*Trachyphonus vaillantii*	-		2 (3)
Black-throated Honeyguide	*Indicator indicator*	-	11 (11)	18 (18)
Lesser Honeyguide	*Indicator minor*	-		3 (4)
Golden-tailed Woodpecker	*Campethera abingoni*	F	6 (7)	5 (7)
Little Spotted Woodpecker	*Campethera cailliautii*	-	2 (2)	5 (5)
Cardinal Woodpecker	*Dendropicos fuscescens*	-	3 (3)	12 (18)
Stierling's Woodpecker	*Dendropicos stierlingi*	-	5 (7)	
Bearded Woodpecker	*Dendropicos namaquus*	-	1 (1)	
African Broadbill	*Smithornis capensis*	FF	x	6 (6)
Flappet Lark	*Mirafra rufocinnamomea*	-	2 (2)	
Black Saw-wing	*Psalidoprocne pristoptera*	-	7 (9)	4 (8)
Mosque Swallow	*Hirundo senegalensis*	-		3 (6)
Lesser Striped Swallow	*Hirundo abyssinica*	-		1 (1)
Black Cuckoo-Shrike	*Campephaga flava*	-	1 (1)	5 (5)
White-breasted Cuckoo-Shrike	*Coracina pectoralis*	-	7 (13)	1 (1)
Yellow-bellied Greenbul	*Chlorocichla flaviventris*	F		14 (20)
Fischer's Greenbul	*Phyllastrephus fischeri*	FF		1 (3)
Common Bulbul	*Pycnonotus barbatus*	-	78 (145)	41(79)
Eastern Bearded Scrub-Robin	*Cercotrichas quadrivirgata*	-	8 (9)	x
White-browed Scrub-Robin	*Cercotrichas leucophrys*	-	14 (18)	4 (4)
White-headed Black Chat	*Myrmecocichla arnotti*	-		2 (4)
Kurrichane Thrush	*Turdus libonyanus*	-	13 (17)	4 (4)
Siffling Cisticola	*Cisticola brachypterus*	-		3 (5)
Piping Cisticola	*Cisticola fulvicapillus*	-	43 (68)	18 (22)
Tawny-flanked Prinia	*Prinia subflava*	-	19 (43)	17 (41)
Red-winged Warbler	*Heliolais erythroptera*	-	2 (4)	2 (6)
Yellow-breasted Apalis	*Apalis flavida*	-	8 (18)	5 (8)
Black-headed Apalis	*Apalis melanocephala*	FF	6 (9)	

Grey-backed Camaroptera	*Camaroptera brachyura*	-	7 (7)	9 (11)
Miombo Wren-Warbler	*Calamonastes undosus (stierlingi)*	-	6 (6)	
Yellow-bellied Eremomela	*Eremomela icteropygialis*	-	18 (29)	
Red-faced Crombec	*Sylvietta whytii*	-	17 (31)	5 (7)
Yellow-bellied Hyliota	*Hyliota flavigaster*	-	26 (48)	
Southern Black Flycatcher	*Melaenornis pammelaina*	-		6 (11)
Pale Flycatcher	*Melaenornis pallidus*	-	10 (29)	
African Grey Flycatcher	*Melaenornis microrhynchus*	-	7 (12)	11 (18)
Ashy Flycatcher	*Muscicapa caerulescens*	F	7 (9)	
Livingstone's Flycatcher	*Erythrocercus livingstonei*	F	8 (15)	17 (43)
Blue-mantled Crested Flycatcher	*Trochocercus cyanomelas*	FF	10 (18)	
East Coast Batis	*Batis soror*	-	85 (158)	29(50)
Rufous-bellied Tit	*Parus rufiventris*	-	13 (24)	3 (5)
African Penduline Tit	*Anthoscopus caroli*	-	3 (4)	
Western Violet-backed Sunbird	*Anthreptes longuemarei*	-	13 (18)	2 (3)
Eastern Olive Sunbird	*Cyanomitra olivacea*	FF	21 (23)	5 (5)
Amethyst Sunbird	*Chalcomitra amethystina*	-	112 (179)	10(20)
Scarlet-chested Sunbird	*Chalcomitra senegalensis*	-	8 (11)	19 (29)
Collared Sunbird	*Hedydipna collaris*	F	20 (23)	17 (23)
Shelley's Sunbird	*Cinnyris shelleyi*	F	4 (5)	
Little Purple-banded Sunbird	*Cinnyris bifasciata*	-	11 (20)	33 (54)
Yellow White-eye	*Zosterops senegalensis*	F	23 (46)	1 (1)
Grey-headed Bush-Shrike	*Malaconotus blanchoti*	-	2 (2)	
Orange-breasted Bush-Shrike	*Malaconotus sulphureopectus*	-	1 (1)	1 (1)
Gorgeous Bush-Shrike	*Telophorus viridis (quadricolor)*	F	14 (15)	
Brown-crowned Tchagra	*Tchagra australis*	-	13 (16)	6 (9)
Black-crowned Tchagra	*Tchagra senegala*	-	3 (3)	1 (1)
Black-backed Puffback	*Dryoscopus cubla*	F	36 (46)	21 (23)
Tropical Boubou	*Laniarius aethiopicus*	-	9 (13)	1 (1)
Brubru	*Nilaus afer*	-	20 (21)	
Eastern Nicator	*Nicator gularis*	F	1 (1)	2 (3)
White Helmet-Shrike	*Prionops plumatus*	-	7 (23)	6 (35)
Retz's Helmet-Shrike	*Prionops retzii*	-	2 (8)	24 (104)
Eastern Black-headed Oriole	*Oriolus larvatus*	-	74 (84)	71 (85)
Eurasian Golden Oriole	*Oriolus oriolus*	-		2 (2)
Square-tailed Drongo	*Dicrurus ludwigii*	F	1 (1)	
Common Drongo	*Dicrurus adsimilis*	-	40(57)	62 (88)
Pied Crow	*Corvus albus*	-	X	
Black-bellied Starling	*Lamprotornis corruscus*	F		2 (2)
Violet-backed Starling	*Cinnyricinclus leucogaster*	-	22 (58)	32(78)
Red-billed Oxpecker	*Buphagus erythrorhynchus*	-		1 (4)
Red-headed Weaver	*Anaplectes rubriceps*	-		3 (5)
Lesser Masked Weaver	*Ploceus intermedius*	-		1 (2)
Village Weaver	*Ploceus cucullatus*	-		3 (81)
Dark-backed Weaver	*Ploceus bicolour*	F		12 (20)
Yellow Bishop	*Euplectes capensis*	-		1 (2)
White-winged Widowbird	*Euplectes albonotatus*	-		1 (4)
Southern Cordon-Bleu	*Uraeginthus angolensis*	-	1 (4)	
Peter's Twinspot	*Hypargos niveoguttatus*	F	2 (2)	3 (4)
Green-winged Pytilia	*Pytilia melba*	-	1 (2)	8 (11)
Bronze Mannikin	*Spermestes cucullatus*	-	1 (16)	3 (33)
Black-and-white Mannikin	*Spermestes bicolour*	-	1 (8)	1 (7)
Reichenow's Seedeater	*Serinus reichenowi*	-	1 (8)	
Yellow-fronted Canary	*Serinus mozambicus*	-	13 (32)	1 (4)

Stripe-breasted Seedeater	*Serinus reichardi (striatipectus)*	-	12 (25)	
Cabanis's Bunting	*Emberiza cabanisi*	-	9 (11)	1 (2)
Golden-breasted Bunting	*Emberiza flaviventris*	-	5 (8)	1 (1)

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First description of the egg with other notes on the biology of Loveridge's Sunbird *Nectarinia loveridgei*

Anders P. Tøttrup and Jørn L. Larsen

Loveridge's Sunbird *Nectarinia loveridgei* is endemic to the Uluguru Mountains (06°43'–07°15'S, 37°32'–37°51'E) (BirdLife International 2003), which are part of the Eastern Arc Mountains in Tanzania (Lovett & Wasser 1993). The Ulugurus are a priority site for conservation of vertebrate species and are considered the third most important area in East Africa for the conservation of forest birds (Burgess *et al.* 1998). The Ulugurus hold two strictly-endemic bird species, five endemic subspecies and additionally 12 range-restricted species (Stattersfield *et al.* 1998, BirdLife International 2003). Six of these species are considered to be globally threatened (BirdLife International 2004a). Loveridge's Sunbird seems to be in no immediate danger of extinction and is currently considered of Least Concern (BirdLife International 2004b). While the total population has recently been estimated between 21 000 and 166 000 individuals, the persistence of Loveridge's Sunbird depends upon the conservation of the Uluguru Mountain Forest Reserves (Tøttrup *et al.* 2004).

Loveridge's Sunbird was first described by Hartert (1922) with further notes by Williams (1950, 1951) and Stuart & van der Willigen (1980). Here we present the first description of the egg and additional information on the biology of Loveridge's Sunbird based on observations collected during three months of fieldwork from 29 August to 28 November 2000.

Breeding biology

Between 1 September and 5 October 2000 five nests containing eggs or nestlings and two newly-built nests were found. Fledglings were recorded from 1 September to 28 November. Combined with former notes by Williams (1951) and Cheke *et al.* (2001), this indicates that the species has an extensive breeding season lasting from at least August until March.

The free-hanging and closed nest built at the understorey level (mean height of 3.1 m above ground) has a small protruding part above the entrance hole and is attached to a branch in bushes or small trees (Figure 1). Dried grasses and fresh green moss are most often used as building material. The latter effectively camouflages the nest in the vegetation. The interior of the nest is lined with moss. Cheke *et al.* (2001) reports an entrance hole of 5 cm in diameter and the nest being 15 cm in length and 9 wide. The

Table 1. Measurements of nest characteristics and clutch size of Loveridge's Sunbird *Nectarinia loveridgei*.

Date	Vertical length (cm)	Width (cm)	Nest hole diameter (cm)	Number of pulli/eggs	Height above ground (m)
2 September	16.5	10	3.2	2 pulli	2
4 September	20	9.5	3.3	3 eggs	1.8
7 September				2 pulli	1.5
22 September				2 pulli	2
22 September					3.5
27 September					2.5
5 October	16	10	3.3	2 pulli	1.5
19 November					10
Mean	17.5	9.8	3.3	2.2	3.1

latter two measures accord well with our results (Table 1); however, we found the entrance hole to average 3.3 cm in diameter ($n = 3$), which is considerably smaller than reported by Cheke *et al.* (2001).

One egg measuring 1.2 x 1.6 cm was photographed. The egg was shiny dark olive-green with an irregular dark pattern. In some areas the dark spots were clustered to form dark shapes, concealing the otherwise dark olive background (Figure 2).

During the breeding season repeated observations were made on two nests, one with eggs and one with nestlings. The female seems to incubate the eggs alone, as no male was seen entering the nest during observation periods. The male was only observed for short periods around the nest with eggs. The nest containing nestlings was visited mostly by the female. The male was observed bringing food to the nestlings through the entrance hole but was never seen to enter the nest. Faecal pellets were only observed being carried away by the female.

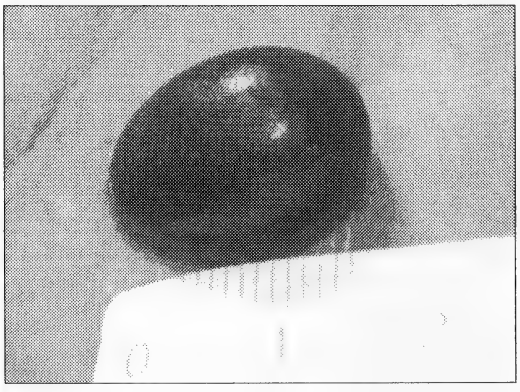

Figure 1. The free hanging nest of Loveridge's Sunbird *Nectarinia loveridgei* (left).

Figure 2. The shiny, dark olive-green coloured egg of Loveridge's Sunbird *Nectarinia loveridgei* (above).

Weight

A total of 400 Loveridge's Sunbirds were caught in mist-nets between 1400 and 2520 m asl and weighed before release. The mean weights of adult males and females were 10.7 g (n = 195) and 9.2 g (n = 172), respectively (Table 2). The sex difference was highly significant (t = 22.0, p < 0.0001; SAS 2000). Data on 33 juvenile and immature birds are also included in Table 2. Our results accord with mean weights reported by Cheke *et al.* (2001) based on smaller sample sizes: 10.6 g (n = 25) for males and 9.0 g (n = 24) for females. We did not control for pregnant females during this breeding period and it is therefore possible that females are normally lighter than we reported.

Table 2. Weights of Loveridge's Sunbird *Nectarinia loveridgei*.

	N	Weight (g) Range	Mean (± SD)
Ad. Male	195	9.0-12.5	10.7 (±0.7)
Ad. Female	172	7.5-11.0	9.2 (± 0.6)
Imm. Male	17	9.0-11.5	10.2 (± 0.7)
Imm. Female	8	8.0-10.0	9.3 (± 0.8)
Juv.	8	7.5-10.0	8.8 (± 0.8)

Survival

A male trapped and ringed as an adult bird during the Uluguru Biodiversity Survey in 1993 (Svendsen & Hansen 1995) was recaptured on 17 November 2000, the bird therefore being at least eight years old at the time of recapture.

Behaviour and distribution

Loveridge's Sunbird was recorded between 1200 and 2560 m and seen in all forest strata including the canopy, where it was observed visiting flowering trees. Males were often observed chasing conspecific males and were recorded singing throughout the day. The first individuals initiated singing 25 min before sunrise and the activity stopped at sunset. Singing intensity was highest during the hour starting 15 min before sunrise, and the hour before sunset.

The species joined mixed feeding flocks, but also fed alone or in pairs, and individuals often gathered in large parties around flowering plants and trees. We observed birds feeding on *Lasianthus cereiflorus* (Rubiaceae) and *Impatiens ulugurensis* (Balsaminaceae), both common in the forest understorey (Jannerup 2004, Grey-Wilson 1980). The nectar diet was supplemented with insects captured by a variety of techniques, including sallying.

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References

BirdLife International. 2003. *BirdLife's online World Bird Database: the site for bird conservation.* Version 2.0. Cambridge, UK: BirdLife International. Available: http://www.birdlife.org (accessed 7 February 2005).

BirdLife International. 2004a. *Threatened birds of the world 2004.* CD-ROM. Cambridge, UK: BirdLife International.

BirdLife International. 2004b. Species factsheet: *Nectarinia loveridgei.* Available: http://www.birdlife.org (accessed 2 March 2005).

Burgess, N.D., Fjeldså, J. & Botterweg, R. 1998. Faunal importance of the Eastern Arc mountains of Kenya and Tanzania. *Journal of East African Natural History* 87: 37–58.

Cheke, R.A., Mann, C. F. & Allen, R. 2001. *Sunbirds, a guide to the sunbirds, flowerpeckers, spiderhunters and sugarbirds of the world.* London: Helm, A. & C. Black Publishers Ltd.

Grey-Wilson, C. 1980. *Impatiens of Africa.* Rotterdam: A. A. Balkema.

Hartert, E. 1922. Exhibition and description of some new African birds. *Bulletin of the British Ornithologists' Club* 42: 49–50.

Jannerup, P. L. 2004. A revision of the genus *Lasianthus* (Rubiaceae) in Africa excluding Madagascar. M.Sc. thesis at the Botanical Museum, Copenhagen, Denmark.

Lovett, J. C. & Wasser, S. K. (eds) 1993. *Biogeography & ecology of the rainforests of eastern Africa.* Cambridge: Cambridge University Press.

SAS. 2000. SAS version 8.02, SAS Institute Inc., Cary, NC, USA.

Stattersfield, A.J., Crosby, M.J., Long, A.J. & Wege, D.C. 1998. *Endemic Bird Areas of the World. Priorities for Biodiversity Conservation.* Cambridge: BirdLife International.

Stuart, S.N. & van der Willigen, T.A. 1980. Is Moreau's Sunbird *Nectarinia moreaui* a hybrid species? *Scopus* 4: 56–58.

Svendsen, J.O. & Hansen, L.A. (eds). 1995. *Report on the Uluguru biodiversity survey 1993.* Sandy: The Royal Society for the protection of Birds, Danish Centre for Tropical Biodiversity and Tanzania Forestry Research Institute.

Tøttrup, A.P., Larsen, J.L. & Burgess, N.D. 2004. A first estimate of the population size of Loveridge's Sunbird *Nectarinia loveridgei* endemic to the Uluguru Mountains, Tanzania. *Bird Conservation International* 14: 25–32.

Williams J.G. 1950. On the status of *Cinnyris mediocris moreaui. Ibis* 92: 645–646.

Williams J.G. 1951. Notes on *Scepomyctes winifredae* and *Cinnyris loveridgei. Ibis* 93: 469–470.

Anders P. Tøttrup*
Zoological Museum, University of Copenhagen, Universitetsparken 15, DK-2100 Copenhagen Ø, Denmark.
Jørn L. Larsen
Zoological Museum, University of Copenhagen, Universitetsparken 15, DK-2100 Copenhagen Ø, Denmark.

**Current address: Centre for Macroecology, Institute of Biology, University of Copenhagen Universitetsparken 15, DK–2100, Copenhagen Ø, Denmark. Email: aptottrup@bi.ku.dk*

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Assessing the status of Handsome Francolin *Francolinus nobilis* in Bwindi Impenetrable National Park, western Uganda

Richard Ssemmanda and Richard A. Fuller

The Handsome Francolin is a ground-dwelling partridge occurring in montane forest and the high-altitude bamboo zone within a restricted area along the Albertine Rift Mountains from the Bleus Mountains in eastern Democratic Republic of the Congo (DRC) south to Burundi (Urban *et al.* 1986, Madge & McGowan 2002). It appears to occur over a global range of about 120 000 km^2 (Fuller *et al.* 2000, BirdLife International 2004), although there are very few recent records from most parts of this area.

The small area of the Albertine Rift Mountains supports 41 endemic bird species, 11 of which are globally threatened (BirdLife International 2004, Plumptre *et al.* 2003). Forest covers much of the 56 000 km^2 in the Albertine Rift Endemic Bird Area, and much of it is rugged terrain very difficult to access (Shaw & Shewry 2001). Despite this, there are significant human pressures in the area, stemming mostly from large increases in human population densities as a result of refugee movements (Omari *et al.* 1999, Gatarabirwa *et al.* 2000). Being large, slow-moving, palatable, terrestrial birds, the Galliformes are under particularly direct pressure from humans through hunting and disturbance, and they may provide useful rapid indicators of the amount of human pressure in a particular area.

The area surrounding Bwindi is one of Uganda's most densely populated rural areas with human densities of 160–320 people/km^2. Approximately 10 000 families cultivate the land immediately surrounding the park (Butynski 1984). About 84 % of the forest compartments display signs of human activity, including pit sawing (29 %), hunting (24 %), mining (6 %), livestock (10 %) and footpaths (67 %) (Butynski & Kalina 1993). This suggests that species providing consumable bush meat are at particular risk.

Pairs and small groups of Handsome Francolins have been encountered in southwestern Uganda (Prigogine 1971, Dehn & Christiansen 2001), and it is frequently seen by birdwatchers, though many visitors see the species within a very small area near Ruhiza, in Bwindi Impenetrable National Park (Rossouw & Sacchi 1998). It has been described as locally common within its small global range (Fuller *et al.* 2000), although there has never been any scientific survey to measure its abundance. No research has ever been

conducted on this species; its nest and eggs are undescribed, its diet and breeding season are unknown and, in view of possible threats, research on its ecology is now urgently needed (Dehn & Christiansen 2001).

As an illustration of how difficult this species is to detect in the field, recent extensive bird surveys using circular plot methods in Bwindi Impenetrable National Park, Uganda, detected Handsome Francolins only once (Shaw & Shewry 2001), and intensive fieldwork in Rwenzori Mountains National Park in 1996 found the species at only one location (Dehn & Christiansen 2001). Handsome Francolins are only seen with any frequency when foraging on wide roads that run though the bamboo zone near Ruhiza (Rossouw & Sacchi 1998) and rarely call in natural situations.

Playback surveys have been successfully used to census populations of elusive birds including several species of Galliformes (Glahn 1974, Marion *et al.* 1981, Gibbs & Melvin 1993, Fuller *et al.* 2004). Playback surveys often detect more birds than conventional methods (Sliwa & Sherry 1992) and have been used to study globally threatened species (Njoroge & Bennun 2000, Carroll & Hoogestein 1995). So we set out to design and test a survey method capable of producing a density estimate for the Handsome Francolin. One possible way of sampling the birds is to play a recording of the advertising call and use the distribution of distances between the observer and the responding bird to generate a detection function (Bibby *et al.* 2000, Buckland *et al.* 2001). We adapted a playback technique used to census Nahan's Francolins *Francolinus nahani* in Uganda (Sande 2001, Fuller *et al.* 2004).

In addition to this, we present new data on altitudinal range, broad habitat preferences and the distribution of the species within Bwindi Impenetrable Forest National Park.

Study area and methods

Between January and March 2004 we studied Handsome Francolins in Bwindi Impenetrable Forest National Park, western Uganda (00°03'S, 29°40'E). With an area of 32 092 ha, the park is completely protected on paper, although extractive use is occasionally sanctioned and illegal extraction of forest resources does occur. Steep hills and narrow valleys characterize Bwindi with a general incline from the northern and western areas below 1750 m, to the southwestern corner above 2250 m. Bamboo thickets are restricted to less than 100 ha. The area is broadly classified as medium-altitude moist evergreen and high-altitude forest (Langdale-Brown *et al.* 1964). Bwindi is an important locality for the conservation of Afromontane fauna in particular those endemic to the Albertine Rift Mountains (Plumptre *et al.* 2003). See Howard (1991) for further details of vegetation types and climatic conditions within the park.

The observer (RS) walked along routes of varying length through the reserve (Figure 1), establishing survey points at least 200 m apart along each

route. Direct distances between points were measured using a handheld GPS receiver rather than distance along the walked route. At each point, the advertising call of the Handsome Francolin (recording taken from Chappuis 2000) was played using a Nakai tape recorder and Sony battery-powered 10 W speaker.

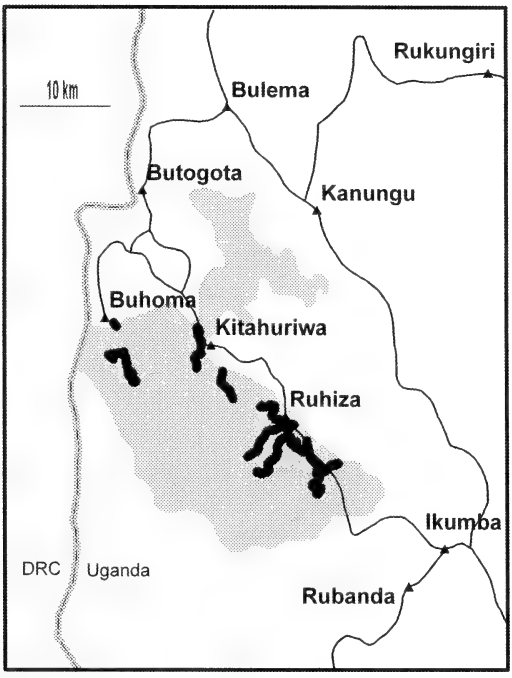

Figure 1. Map showing the location of Bwindi-Impenetrable National Park (shaded grey) in southwest Uganda, together with locations of the survey routes (shown in black).

The Handsome Francolin advertising call was played for 20 s and any response noted in the ensuing 120 s. This process was repeated twice, to give a total of three successive playbacks. The distance to any calling group and the playback episode after which it responded were noted for each responding group. Distances were estimated to the nearest 15 m. The observer had extensive previous experience of estimating distances to calling birds and, prior to commencing fieldwork, checked the accuracy of distance estimation by visually locating calling birds along tracks around Ruhiza and confirming their actual distance.

All playback surveys were conducted between 07:00 and 13:00, as the birds appeared to call more frequently in the morning. In the case of rain (only one day was affected), surveying was suspended until the rainfall had ceased. Routes were walked entirely along existing trails in the forest. The reasons for this were fourfold. Firstly, we wanted to minimise the impact of

our work, and opening up new trails through the forest would have caused environmental damage as well as opened up the areas for hunters and loggers to enter the forest. Secondly, cutting our own path through the forest would have made a lot of noise, and probably seriously affected the results of the survey if birds were repelled from the point count area. Thirdly, cutting trails is time-consuming and would have severely reduced our sample sizes and the comprehensiveness of our survey work. Fourthly, the terrain was extremely steep and precarious in places, so for safety reasons a strictly randomised design was not possible. Most of the trails were very narrow and unlikely to bias the results through edge effects.

A handheld GPS was used to measure location and altitude at each survey point with an average error of about 10 m. Broad habitat type at each survey point was classified as forest, bamboo or a mixture of the two. To investigate habitat selection by the francolins in more detail, a sample of points where (a) francolins were detected and (b) not detected, was chosen at random along each route. Points were chosen to provide an approximately equal sample of locations at which francolins were detected and locations at which francolins were not detected. To avoid disturbing birds, habitat surveys were conducted after playback sampling was completed each day, typically by retracing our steps along the route and stopping at the randomly selected points to take habitat measurements.

At points where francolins were detected, the estimated distance and measured bearing were used to locate the approximate position of calling groups, from where detailed habitat data were collected. At points where francolins were not detected, habitat data were collected 30 m from the survey point in a random direction chosen using random number tables. Where it was physically impossible to reach the position of a calling francolin group (for example where the terrain was too steep to be crossed safely) or the randomly selected position, detailed habitat data were not collected at that point.

For detailed habitat data, a 5 x 5 m quadrat was estimated around the sample location. The observer stood at the centre of this quadrat and estimated the following habitat variables: (i) height of the canopy, defined as all vegetation above 11 m in height; (ii) percentage canopy cover (iii) height of the understorey, defined as vegetation between 2.5 and 11 m in height; (iv) percentage cover by the understorey; (v) height of the ground vegetation, defined as all vegetation less than 2.5 m in height; (vi) percentage cover of ground vegetation; (vii) circumferences of all live trees within the quadrat with a diameter at breast height (dbh) > 20 cm; (viii) number of trees with dbh < 20 cm; (ix) depth of leaf litter, expressed as the average leaf litter depth at four random points in the quadrat; (x) distance to the nearest buttressed tree (possibly used as nesting or roosting sites, as in other forest-dwelling francolins), defined as a tree with at least one buttress that was distinct from the trunk at > 2 m from the

ground; (xi) circumference at breast height of the nearest buttressed tree; (xii) number of buttresses on the nearest buttressed tree. If a buttressed tree could not be located within 30 m of the centre point, the search was abandoned.

Results

Playback surveys

Between January and March 2004, playbacks were conducted at 244 points. Responses by 25 groups at 21 points were obtained, giving a ratio between the number of points surveyed to responding groups of 10:1. Handsome Francolins rarely called spontaneously; francolin calls not stimulated by tape playback were heard only nine times during the fieldwork period. Most of these spontaneous calls were heard around dawn and dusk, (05:00–06:30 and 19:00–19:45) and were in or near the bamboo zone at Ruhiza. Our dataset was not large enough to generate a robust population density estimate, but we have succeeded in demonstrating that playback can be used to survey for Handsome Francolins.

Elevation

The altitude of survey points ranged from 1468 m to 2541 m. Handsome Francolins were detected between the altitudes of 1541 m and 2541 m. The altitude of survey points at which birds responded to the tape was higher than the altitude of survey points where no response was detected (median altitude with no response = 2200 m, median altitude with response = 2399 m; $U_{223,21}$ = 553.5, p = 0 011), suggesting that birds were selecting higher-altitude regions of the study area.

Broad habitat type

The broad habitat types surveyed were altitudinally distinct. Forest occurred from the lowest parts of the reserve at 1500 m up to 2200 m, and the bamboo zone from about 2400 m upwards. The vegetation between these two zones was mixed.

Francolins were detected far more frequently in bamboo habitat than in forest habitat (G_{adj} = 13.018, $p < 0.001$). Birds responded at over 30 % of survey locations in bamboo and about 6 % of the locations in forest, whilst there were no responses in any of the mixed habitat survey points (Table 1).

Habitat structure

A total of 50 habitat plots was assessed, comprising 31 plots at randomly chosen points where francolins were not heard, and 19 at points where francolins were heard.

Canopy cover or height did not differ between random and francolin survey points (canopy cover: t = 0.01, d.f. = 48, p = 0.992; canopy height: t = 0.82, d.f. = 48, p = 0.416). However, variables relating to the structure of

Table 1. The number of survey points in each of the six broad habitat types where francolin groups responded to playback. Because no birds responded in mixed forest, data were analysed using a G-test with Williams correction on a 2 x 2 contingency table to compare the frequency of detections in bamboo and forest habitat types.

	Bamboo	Forest	Mixed	Total
Francolins not detected	19	183	21	223
Francolins detected	9 (32%)	12 (6%)	0 (0%)	21 (9%)
Total	28	195	21	244

the understorey and ground vegetation were strong predictors of francolin presence. Understorey was denser at locations where francolins were found than at random points ($t = 2.1$, d.f. = 48, $p = 0.044$), and percentage cover of ground flora was much lower ($t = 2.68$, d.f. = 48, $p = 0.010$), suggesting that birds preferred areas with more bare ground, but denser understorey cover. Tree density was much higher at locations where francolins were detected than at random points (francolin points = 35 trees per quadrat; random points = 19 trees per quadrat; $t = 3.66$, d.f. = 48, $p < 0.001$). Furthermore, the girth of large trees (those with a dbh < 20 cm) was significantly higher at francolin points than at random points (francolin points = 1.55 m; random points = 2.08 m; $t = 2.67$, d.f. = 48, $p = 0.010$).

Distance to the nearest buttressed tree and the number of buttresses on the nearest buttressed tree did not differ between random and francolin survey points (distance: $U_{21,15} = 121.0$, $p = 0.252$; number of buttresses: $U_{23,17} = 194.5$, $p = 0.978$). The circumference of the nearest buttressed tree was significantly larger at locations where francolins were found than at random points ($U_{21,15} = 76.0$, $p = 0.008$), although this probably simply reflects the general association with forest comprising large trees described above.

Discussion

Our work has demonstrated that playback surveys can be used effectively for surveying Handsome Francolin. Surveyors can expect responses at about 9 % of survey points. Owing to the long delay between stimulus and response, the surveyor should play back the recording and wait for responses for at least 5 min at each survey point. This information allows improved planning of future surveys for the species. Such survey work could incorporate detailed ecological research without compromising its efficiency.

Our data suggest that the species occurs at relatively low densities, and we therefore consider that a quantitative understanding of the conservation status of this species is urgently required so it can be evaluated properly against IUCN threat criteria. In view of its strong preference for bamboo, a rare and patchy habitat, there is a possibility that its global population size is rather low.

Habitat and altitude

We have confirmed the presence of Handsome Francolins at 1541 m above sea level. This extends downward the known altitudinal range of the species, and interviews with local bird guides suggest that it occurs regularly at this altitude. However, overall the species shows a marked preference for higher-altitude areas in Bwindi, and in particular, bamboo habitat. This habitat occurs in isolated patches near mountaintops in Uganda and along the Albertine Rift. There are less than 100 ha of bamboo in Bwindi (UNEP-WCMC 2004), and bamboo is regularly removed from the park (Butynski 1984). The extreme rarity of this habitat may have serious implications for the conservation status of the Handsome Francolin, particularly where forest connections between bamboo 'islands' have been cleared for agriculture and may prevent effective movement among suitable habitat patches. Further study of seasonal use of different habitat types would be worthwhile, to help us understand if and how birds move among patches of high altitude bamboo.

Bwindi has comparatively dense forest and a diverse tree flora (Eilu *et al.* 2004), suggesting that it may form prime habitat for Handsome Francolins, which selected areas of high tree density within the Park. Our data indicate that the francolins selected sites with a high density of large trees with dense understorey but sparse ground cover typically associated with undisturbed forest. This suggests that the species may be adversely affected by selective logging and other forms of forest degradation.

Hunting pressure

Discussions with local people, nature guides and park staff indicated that hunting of francolins in Bwindi was still widespread. Seven francolin traps were found during the survey work, mostly in the bamboo zone near to the human settlements around Ruhiza. These traps require a great deal of maintenance and regular checking, so there are at least some local people in the Ruhiza area who concentrate on trapping Galliformes (presumably both Scaly *F. squamatus* and Handsome Francolins) for food. Indeed, the Handsome Francolin became locally extinct in the Ruhiza area after the birds were hunted for food (A. Twinomujuni pers. comm.), so there is evidence that they are vulnerable to human persecution. The larger scale impact of hunting on francolin populations remains difficult to assess, and a much larger study in the future would be required to understand this issue. Given the apparently low density of Handsome Francolins in Bwindi, any direct persecution of the birds could translate into a profound population-level effect.

Interviews with local people also indicated that, during hunting expeditions, eggs of Galliformes such as the Scaly Francolin, Crested Guineafowl *Guttera pucherani* and the Handsome Francolin are an extra source of protein while camping in the forest. Working with these people

could be a good opportunity to locate nests and eggs of the Handsome Francolin, which have never been described. Traditional healers also exploit these species, which are collected through their clients.

The Handsome Francolin is currently listed as Lower Risk (least concern) by BirdLife International (2004), because of its relatively large global extent of occurrence and the fact that no evidence of a population decline has been found. In fact, no systematic surveys allowing robust estimates of population trajectories have ever been published for this species, so it is difficult to make an evaluation against IUCN criteria. Given that the more widespread Nahan's Francolin is listed as Endangered, the status of Handsome Francolin must be urgently investigated, particularly because it is rarely encountered by birdwatchers away from Bwindi (Uganda) and Nyungwe Forest (Rwanda), and therefore may be uncommon in parts of its range.

Research priorities

Our knowledge of this species is in its infancy, but at least we now have a reliable method for surveying it. We suggest the following research priorities:

1. Extensive surveys are urgently required to generate a global picture of the distribution and status of this species. Data are required from Kibira National Park (DRC), forests west of Lake Edward (DRC), Itombwe Mountains (DRC), Kahuzi-Biéga National Park (DRC), Lendu Plateau (DRC), Virunga National Park (DRC), Nyungwe Forest (Rwanda), Parc National des Volcans (Rwanda), Bwindi Impenetrable National Park (Uganda), Echuya Forest Reserve (Uganda), Mgahinga Gorilla National Park (Uganda) and Rwenzori Mountains National Park (Uganda).
2. Once surveys are completed, a thorough evaluation of the species against IUCN threat criteria is required.
3. Given the anecdotal evidence, an understanding of the effects of hunting on the species is required. This could be achieved by comparing francolin densities in areas with different levels of hunting pressure.
4. Information on the dispersal capabilities of Handsome Francolins will help us understand how and if they move between isolated bamboo patches. This might also include an investigation into the genetic structure of the population, given that it appears to exist in isolated fragments rather than show a continuous distribution. This may help to identify populations that are at particular risk and not able to colonise new areas.
5. Nothing is currently known about the breeding biology of Handsome Francolin and even the nest and eggs remain undescribed. Bwindi is a good place to investigate this, perhaps in collaboration with local hunters.
6. Detailed ecological study of Handsome Francolins will help describe seasonal patterns in movement and breeding of the species. Ideally, all members of one or more groups should be radio-tagged and followed for as

long as possible. Given that birds are frequently seen in a very local area near Ruhiza, there is some evidence that radio-tracking is likely to work effectively, but the difficulty of traversing the terrain must be taken into account when choosing a location for radio-tracking work.

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References

Bibby, C.J., Burgess, N.D. & Hill, D.A. 2000. *Bird census techniques*. London: Academic Press.

Buckland, S.T., Anderson, D.R., Burnham, K.P., Laake, J.L., Borchers, D.L. & Thomas, L.J. 2001. *An introduction to distance sampling: estimating abundance of biological populations*. Oxford, UK: Oxford University Press.

Butynski, T.M. 1984. *Ecological Survey of the Impenetrable (Bwindi) Forest, Uganda, and Recommendations for its Conservation and Management*. Report to the Government of Uganda. New York: Wildlife Conservational International.

Butynski, T.M. & Kalina, J. 1993. Three new mountain national parks for Uganda. *Oryx* 27: 214–224.

Carroll, J.P. & Hoogestein, A. 1995. Observation of the Venezuelan woodquail at Rancho Grande, Henri Pittier National Park, Venezuela. *Annual Review of the World Pheasant Association* 1993 4: 67–72.

Chappuis, C. 2000. *African Bird Sounds*. CD set. Claude Chappuis & British Library, London.

Dehn, M. & Christiansen, L. 2001. Comments on the occurrence of 15 Albertine Rift endemic bird species in the Ruwenzori Mountains National Park, Western Uganda. *Scopus* 22: 13–21.

Eilu, G., Hafashimana, D.L.N. & Kasenene, J.N. 2004. Density and species diversity of trees in four tropical forests of the Albertine rift, western Uganda. *Diversity & Distributions* 10: 303–312.

Fuller, R.A., Carroll, J.P., & McGowan, P.J.K. (Eds.). 2000. *Partridges, quails and francolins – Status survey and conservation action plan 2000–2004*. Gland, Switzerland and Cambridge, UK: IUCN.

Fuller, R.A., Akite, P., Amuno, J.B., Flockhart, C., Ofwono, J.M., Proaktor, G. & Ssemmanda, R. 2004. *Recovery of the Nahan's francolin*. Final project report.

Gatarabirwa, W., Kanyamibwa, S. & Ukizintambara, T. 2000. Promoting sustainable conservation under conditions of poverty and civil strife in the Albertine Rift. *Ostrich* 71: 33–35.

Gibbs, J.P. & Melvin, S.M. 1993. Call-response surveys for monitoring breeding waterbirds. *Journal of Wildlife Management* 57: 27–34.

Glahn, J.F. 1974. Studies of breeding rails with recorded calls in northcentral Colorado. *Wilson Bulletin* 86: 206–214.

Howard, P.C. 1991. *Nature conservation in Uganda's tropical forest reserves.* Gland, Switzerland & Cambridge, UK: IUCN.

Langdale-Brown, I., Osmaston, H.A. & Wilson, J.G. 1964. *The Vegetation of Uganda and its Bearing on Land Use.* Entebbe: Government Printers.

Madge, S. & McGowan, P. 2002. *Pheasants, partridges and grouse.* London: Christopher Helm.

Marion, W.R., O'Meara, T.E. & Maehr, D.S. 1981. Use of playback recordings in sampling elusive or secretive birds. Pp. 81–85 *in* Ralph, C.J. & Scott, J.M. (eds) *Estimating numbers of terrestrial birds.* Studies in Avian Biology No. 6.

Njoroge, P. & Bennun, L. 2000. Status and conservation of Hinde's Babbler *Turdoides hindei*, a threatened species in an agricultural landscape. *Ostrich* 71: 69–72.

Omari, I., Hart, J.A., Butynski, T.M., Birhashirwa, N.R., Upoki, A., M'Keyo, Y., Bengana, F., Mugunda, B. & Bagurubumwe, N. 1999. The Itombwe Massif, Democratic Republic of Congo: biological surveys and conservation, with an emphasis on Grauer's gorilla and birds endemic to the Albertine Rift. *Oryx* 33: 301–322.

Plumptre, A.J., Behangana, M., Ndomba, E., Davenport, T., Kahindo, C., Kityo, R., Ssegawa, P., Eilu, G., Nkuutu, D. & Owiunji, I. 2003. *The biodiversity of the Albertine Rift.* Albertine Rift Technical Reports No. 3.

Prigogine, A. 1971. *Les oiseaux de l'Itombwe et de son hinterland.* Vol. 1.

Rossouw, J. & Sacchi, M. 1998. *Where to Watch Birds in Uganda.* Kampala: Uganda Tourist Board.

Sande, E. 2001 *The ecology of the Nahan's francolin* Francolinus nahani *in Budongo Forest Reserve, Uganda.* PhD thesis. Kampala: Makerere University.

Shaw, P. & Shewry, M. 2001. Population density and habitat associations of restricted-range bird species at Ruhija, Bwindi Impenetrable Forest, Uganda. *Bird Conservation International* 11: 161–174.

Sliwa, A. & Sherry, T.W. 1992. Surveying wintering warbler populations in Jamaica: Point counts with and without broadcast vocalizations. *Condor* 94: 924–936.

UNEP-WCMC. 2004. Protected Areas Programme Database. Accessed at http://www.unep-wcmc.org/sites/wh/virunga.html on 11 September 2004.

Urban, E.K., Fry, C.H. & Keith, S. (eds) 1986. *The birds of Africa.* Vol. II. Princeton: Princeton University Press.

Richard Ssemmanda
Department of Wildlife and Animal Resource Management, Makerere University, P.O. Box 10066, Kampala, Uganda. Email: ssemmarich@yahoo.com
Richard Fuller
Department of Animal & Plant Sciences, University of Sheffield, Western Bank, Sheffield, S10 2TN, United Kingdom. Email: r.a.fuller@sheffield.ac.uk

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Foraging observations of the threatened Long-billed Tailorbird *Artisornis moreaui* in Tanzania

Jay McEntee, Norbert J. Cordeiro, Martin P. Joho and David C. Moyer

The Long-billed Tailorbird *Artisornis moreaui* is a critically endangered warbler with an highly disjunct distribution. It is known from forest and forest edge at two locations 950 km apart—subspecies *moreaui* of the East Usambara Mountains of northeast Tanzania and subspecies *sousae* at Serra Jeci (Njesi Plateau) in northern Mozambique (Irwin 1997). Cordeiro *et al.* (2001) estimated the East Usambara Long-billed Tailorbird population size as 150–200 individuals in June 2000. After a 57-year gap in ornithological surveys, Ryan & Spottiswoode (2003) recently confirmed that the Mozambique population has survived the country's civil war. Their report of a pair of Long-billed Tailorbirds in the forest canopy at Serra Jeci corroborates the previously debated descriptions of habitat use made by the collector Jali Makawa (Benson 1945, 1946). This anecdotal information for the *sousae* subspecies contrasts with most descriptions of habitat use in the nominate East Usambara subspecies *moreaui*, which is frequently described as an understorey resident (Stuart 1981, Collar & Stuart 1985, Collar *et al.* 1994, Irwin 1997). In 2001, we collected data on foraging behaviour over two weeks at Amani Nature Reserve in Tanzania's East Usambara Mountains. These data provide insight into *moreaui's* typical foraging heights, foraging substrate and foraging style.

Study area and methods

The Amani Nature Reserve (04°S, 38°E), gazetted in 1997, is located within the East Usambara Mountains, northeast Tanzania. It comprises 8380 ha of near-continuous submontane and lowland rain forest, broken up in some areas by roads and agriculture. Schulman *et al.* (1998) describe this site in detail.

We observed the foraging behaviour of Long-billed Tailorbirds between 18 and 30 April 2001. On the Amani plateau, pairs are territorial, making it possible to repeat observations of specific pairs on different days. Therefore, for each day of observation, we targeted one of five potential territories where birds had previously been seen. To assess foraging style we recorded the types of manoeuvre made following Remsen & Robinson (1990). We

recorded foraging substrates in two ways: (i) the substrate on which the bird attacked (live leaf, dead leaf, branch) and (ii) the general vegetation type of that substrate (vine tangle, tree, shrub) when possible. The vegetation was too dense at some higher up foraging attack sites to distinguish between plants. Prey type was rarely observed. We also measured or estimated the height of each foraging attack.

Results

We recorded 56 foraging manoeuvres made by 8–11 individuals at four out of five sites during nine days of observations. Three of the four sites were roadside territories at the forest edge, while the fourth was a wet glade in the interior of the forest.

Foraging heights varied from 0.5 m to 24 m with a median of 3.9 m (n = 56, Figure 1). 85.7 % of foraging manoeuvres were gleans and most foraging attacks (71.4 %) occurred on live leaves (Table 1), most frequently on the underside of the leaves. We were able to categorise the vegetation type of 51 foraging manoeuvres with 86.3 % of these occurring in vine tangles. The only exceptions were four foraging attacks in *Lantana* shrubs, two in a small exotic bamboo (*Bambusa* sp.), and one on a tree leaf immediately adjacent to a vine tangle.

Discussion

We argue that descriptions of *moreaui* as an understorey resident (Stuart 1981, Collar & Stuart 1985, Collar *et al.* 1994, Irwin 1997) of East Usambara forests require some modification as they have led to the perception that this subspecies will not forage in the canopy. Irwin (1997) states that this bird "feeds no higher than 10 m". Furthermore, the term 'understorey' itself causes confusion, as the height and vegetation types of understorey are frequently not defined. For the purpose of this discussion, we define the East Usambara forest understorey as comprising shrubs, seedlings, saplings, vines and climbers whose foliage is predominantly below the minimum height of the local tree canopy (from 0 to between 5 and 10 m). Vines typically reach well above these heights and into the canopy at Amani Nature Reserve, especially at forest edges and in natural or man-made forest

Table 1. Attack manoeuvre types, substrate and vegetation classifications for Long-billed Tailorbird *Artisornis moreaui moreaui* foraging attacks.

Attack manoeuvres (n = 56)					
Glean	Reach-out glean	Reach-up glean	Reach-down glean	Probe	Lunge
28	8	9	3	2	6

Substrate (n = 56)		
Live leaf	Branch	Dead leaf
42	9	5

Vegetation type (n = 51)			
Vine	*Lantana camara*	Exotic bamboo (*Bambusa* sp.)	Tree
44	4	2	1

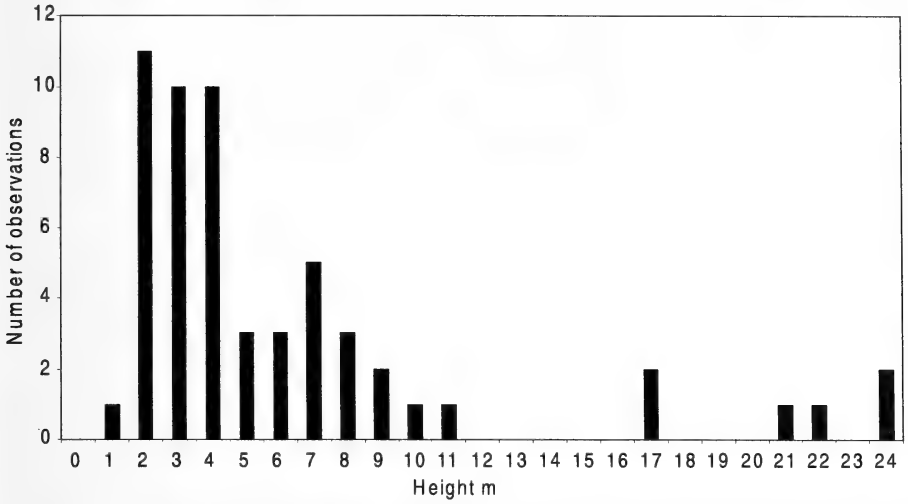

Figure 1. Distribution of foraging attack heights from 56 observations of 8 to 11 individuals of Long-billed Tailorbird *Artisornis moreaui moreaui* (median = 3.9 m).

gaps. We observed *moreaui* foraging at heights up to 24 m in vine tangles, not only as a result of following tangles upwards from the understorey but also by flying directly across forest clearings at these heights. Based upon these observations, it is clear that the *moreaui* subspecies utilises micro-habitats rich in vines irrespective of height.

The median height of our foraging observations (3.9 m) is considered understorey according to our definition, and certainly individuals spent much of their time low in the vegetation where vines were present. We believe, however, that further observations of this subspecies along forest edges and in natural forest clearings will reveal much more activity in the mid- to upper-forest canopy. Ryan & Spottiswoode (2002) suggested a difference in habitat use between the two subspecies of Long-billed Tailorbird based on old sightings of *sousae* in the canopy (Benson 1945, 1946) and their own recent observations of a pair in the canopy at Serra Jeci. However, comparisons of habitat use between the two subspecies are likely to be a more complex issue than a simple understorey–canopy dichotomy. The East Usambara and Serra Jeci forests undoubtedly differ in vegetation structure, so direct comparisons on habitat use between the two locations are difficult to make. Cordeiro *et al.* (2001) alluded to this problem in noting that the canopy heights at the two locations are disparate. Additionally, evidence of habitat use for *sousae* is particularly scant.

A second debatable perception of *moreaui* habitat use is that it prefers forest edge to interior forest. While the birds occupy the forest edge in many areas around Amani Nature Reserve, they are also present in interior forest openings. MPJ and NJC have discovered *moreaui* at 13 locations in forest glades deep in the forest interior. In this study, we observed 17 foraging manoeuvres in a large interior forest wetland glade, habitat similar to forest edge in its preponderance of vines. Indeed, within this forest glade, all

foraging manoeuvres observed were gleans off vine leaves. Thus, while our data do not allow us to formally assess habitat preferences, it does support suggestions that the Long-billed Tailorbird depends in part on light gaps or edges (Sclater & Moreau 1931, Stuart 1981), where vines and climbers are most prevalent.

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References

Benson, C.W. 1945. A new subspecies of Long-billed forest warbler from northern Portuguese East Africa. *Bulletin of the British Ornithologists' Club* 56: 19.

Benson, C.W. 1946. A collection of birds from near Unangu, Portuguese East Africa. *Ibis* 88: 240–241.

Collar, N.J. & S.N. Stuart. 1985. *Threatened Birds of Africa and Related Islands. The ICBP/IUCN Red Data Book, Part 1. 3rd Edition.* Cambridge: ICBP.

Collar, N.J., Crosby, M.J. & Stattersfield, A.J. 1994. *Birds to Watch 2: The world list of Threatened Birds.* Cambridge: BirdLife International.

Cordeiro N.J., Pohjonen, V.M. & Mulungu, E. 2001. Is the critically endangered long-billed (moreau's) tailorbird *Orthotomus* [*Artisornis*] *moreaui* still safe in the East Usambaras? *Bulletin of the African Bird Club* 8: 91–94.

Irwin, M.P.S. 1997. Genus *Artisornis* in Urban, E.K., Fry, C.H. & Keith, S. (eds) *The birds of Africa* Vol. V. London: Academic Press.

Remsen, J.V. & Robinson, S.K. 1990. A classification scheme for foraging behaviour of birds in terrestrial habitats. *Studies in Avian Biology* 13: 144–160.

Ryan, P.G. & Spottiswoode, C.N. 2003. Long-billed tailorbirds (*Orthotomus moreaui*) rediscovered at Serra Jeci, northern Mozambique. *Ostrich* 74: 141–145.

Schulman, L., Junikka, L., Mndolwa, A. & Rajabu, I. 1998. Trees of Amani Nature Reserve. Tanzania: The Ministry of Natural Resources and Tourism.

Sclater, W.L. & Moreau, R.E. 1933. Tazonomic and field notes on some birds from north-eastern Tanganyika Territory. *Ibis* 13: 1–33.

Stuart, S.N. 1981. An explanation for the disjunct distributions of *Modulatrix orostruthus* and *Apalis* (or *Orthotomus*) *moreaui*. *Scopus* 5:1–4.

Jay McEntee
1104 Euclid Ave, Berkeley, CA 94708, U.S.A. Email: jaymcentee@yahoo.com
Norbert J. Cordeiro
Department of Biological Sciences mc066, University of Illinois, Chicago, U.S.A. Email: ncorde1@uic.edu
Martin P. Joho
P.O. Box 1 Amani, Tanga Region, Tanzania
David C. Moyer
Wildlife Conservation Society, PO Box 936, Iringa, Tanzania. Email: dmoyer@wcs.org

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River Prinia *Prinia fluviatilis* near Lokichokio: a new species for Kenya and East Africa

Brian W. Finch

Most recent additions to the Kenyan list have been palearctic vagrants or species found near border areas of neighbouring countries. To find a breeding population of a species as yet unrecorded from any of Kenya's five neighbours, and found no closer than western Chad, is a surprise indeed.

Jeffrey James and myself were exploring the Lokichokio area in northern Kenya for four days in 2001. On the 8 August 2001 we drove southeast from the town across the Lokichokio River (just before the AMREF camp) towards Nanam village which is about 20 km from Lokichokio, on the Lotikipi Plains. Twelve kilometres south-southwest of the village we reached the Loparin River. This seasonally flooding river winds across the desert plain, which is devoid of any vegetation further than 30 m from the river. The river has its source in the Sogot Hills.

A short way from the river I could hear a piercing monotonous call coming from the vegetation growing inside the currently dry (although damp) river bed. We soon located the author of this loud call sitting on top of a spiny Papillionaceus tree (the same type that has taken over the foreshore at Lake Baringo). This tree formed a very dense cover, creating a very cool shade, and growing to a height of over 4 m. In the space of 700 m we encountered around five territories. We did not persist in exploring other parts of this river which is in excess of 70 km in length. Views from the aircraft revealed many similar rivers bordered by vegetation spilling out onto the plains.

Observations

Descriptions were taken on the spot using a recording device. The bird was similar to Pale Prinia *Prinia somalica* in appearance and that is the best species with which to make comparison. Although Zimmerman *et al.* (1996) do not indicate Pale Prinia as occurring west of Lake Turkana, it is in fact the most abundant bird species in the low Acacia scrub all around Lokichokio. We had seen many on the morning of 8 August, but the species was not seen on the plains south of Nanam as there was no suitable habitat.

Description

Smaller and slighter than Pale Prinia with a much shorter tail, markedly graduated with rounded tip, rather than long with a rather squared end. Whilst singing from the top of a tree, the bird remained perched upright, remaining perfectly still, with the short tail pointing vertically downwards.

Overall it was a much cleaner, smoother looking bird than Pale Prinia which usually appears somewhat bedraggled. Upperparts including crown were a clear greyer brown, the flight feathers were a shade browner, the tail from the upper surface a little paler. The facial markings were clear and

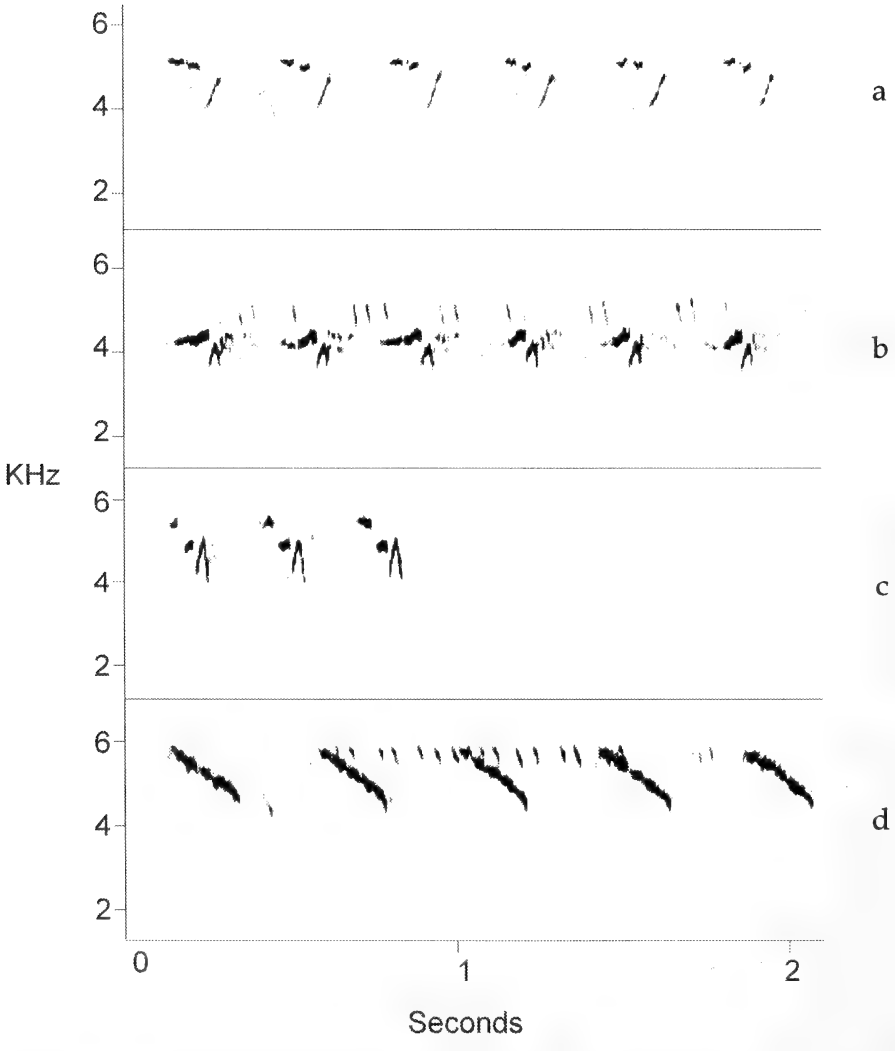

Figure 1. Sonograms of vocalisations of River Prinia *Prinia fluviatilis* recorded near Lokichokio, northern Kenya. Graphs a,b and c show variations of song type 1 and d shows song type 2, as described in the text.

distinct with a short narrow whitish supercilium stopping abruptly just behind the eye, instead of sweeping back and fading as in Pale Prinia. A blackish line ran from the base of the bill through the eye to a short distance behind the eye. The throat was whitish but the breast had a hint of lemon yellow (possibly a reflection from the vegetation) and the flanks were washed buff. The underside of the tail was buffy-white and showed dark subterminal bars and whitish tips to the tail feathers. Since the outer retrices were so much shorter, there appeared to be one dark band approximately one-third of the way down the tail, another band two-thirds the way down and the final band shortly below that.

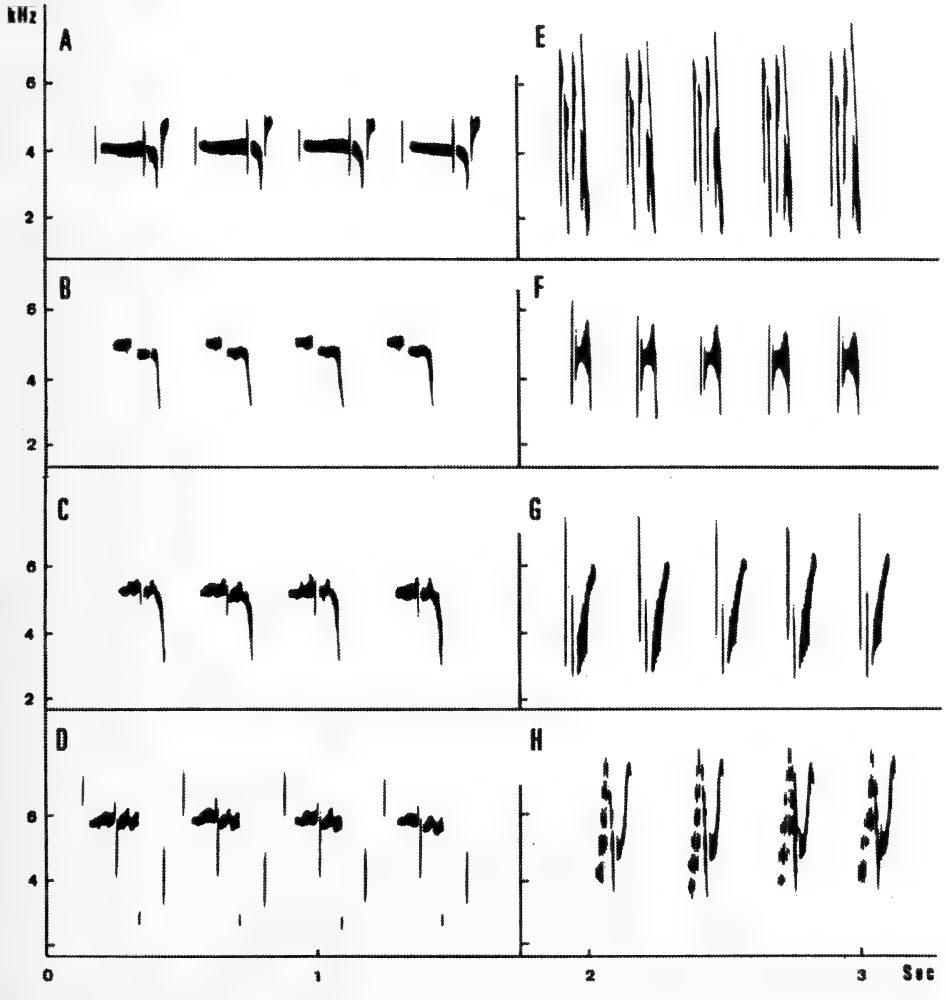

Figure 2. Songs of *P. fluviatilis* from northern Chad (A), Niger (B), northwest Senegal (C,D) and *P. subflava* from Kenya (E), central Chad (F), Ivory Coast (G) and northern Senegal (H). Reproduced from Chappuis *et al.* (1992) with kind permission of the editor.

The bill was black and quite long and slender when compared to Pale Prinia, the eyes brownish and the legs quite a bright fleshy-pink.

Habits

The habit of singing with the tail held vertically downwards has already been mentioned. Singing individuals sat completely still. Displaying males called on the wing as well as when perched, when they indulged in short sorties from one tree to another with a curious undulating skipping flight, possibly with tail slightly fanned. On landing, the female shortly arrived and the pair would chitter noisily, and engage in chases.

The males did not respond to playback of their calls, but when female churring notes were recorded and played back both sexes flew in and behaved very agitatedly as close as one and a half metres. The birds were by no means shy.

Single birds would forage inside of the vegetation, creeping around quietly at the bases of the trees, but without any nervous activity other than vertical flicking of the tail.

Vocalisations

A variety of calls were heard and a substantial amount was tape recorded (Figure 1). The first song was a very piercing, metallic, downslurred "siet-siet-siet-siet..." repeated for long periods with unvarying notes at a rate close to 3 per s. A second song was slightly lower in tone and slower with less urgency, non-metallic and more downslurred "siu-siu-siu..." given repeatedly without variation at a rate of 2 per s. A third song was similar to the first but given in punctuated series of 6–8 notes, with a short pause between each set, also given for long periods.

When duetting, the female answered the male with a short downslurred buzzy trill. When excited, the male gave a repeated loud stacatto clicking. When the pair were calling together, the male also gave the first song interspersed with chipping notes very like a call of Tawny-flanked Prinia *Prinia flava*. The duet consisted of 3–4 short metallic upslurred "silit-silit-silit" notes given in series, punctuated by the female answering with single, double or triple buzzy "shrerr" notes.

Discussion

On consulting the literature (Urban *et al.* 1997) it became clear that we had stumbled on an isolated population of River Prinia *Prinia fluviatilis*, far from any known population. This was confirmed on comparing the recordings of the songs and calls I had made to those recorded by Chappuis from West Africa (Chappuis *et al.* 1992, Chappuis 2000, Figure 2). These recordings are almost identical, though his series lacks the variety found in the Kenyan birds.

The world distribution of this bird is confined to sub-Sahelian Africa. With the discovery of the Lokichokio population it now has a very wide

range from Senegal in the west to Kenya in the east. However, records from across this region are few (see editorial comment below). Currently it is known from northwest Senegal, Mali and countries around Lake Chad, the closest to Kenya being Ndjamena at the south end of Lake Chad (R. Dowsett in litt., see below). It seems likely that there are other pockets of the species awaiting discovery in the many hundreds of kilometres that separate these populations. At the moment it must have one of the most curiously disjunct distributions of any African bird.

References

Chappuis, C. 2000. *African bird sounds 2. West and Central Africa.* Paris: Société d'Etudes Ornithologiques de France.

Urban, E.K., Fry, C.H. & Keith, S. (eds) 1997. *The birds of Africa* Vol. V. London: Academic Press.

Zimmerman, D.A., Turner, D.A. & Pearson, D.J. 1996. *Birds of Kenya and northern Tanzania.* London: Christopher Helm.

Brian W. Finch
P.O. Box 15568, Nairobi, Kenya

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Editorial comment

This record has been accepted by the East Africa Rarities Committee. R. Dowsett (in litt.) has provided additional comment on the distribution of this species: "There are hitherto published (specimen or tape) records from: Senegal (Djoudj and lac Guiers, Richard-Toll); Niger (the Niger river between Tillabery and Gao, south of Gao: not in Mali, as in the summary of Chappuis *et al.* 1992 and Urban *et al.* 1997); Chad (Ndjamena, south end of Lake Chad). Subsequently, the species has been found in Mali (Gao: P. Robertson in litt.; pers. obs.); Niger (extra localities, Niamey and Tamou: J. Brouwer in litt.); Nigeria (Baga and Malamfatori, Lake Chad: Ottosson *et al.* 2002); Cameroon (Waza: not found by Scholte *et al.* 1999, but reported by M. Andrews pers. comm.). The suggestion that the species has been found in Guinea-Bissau (Barlow *et al.* 1997) is based on the supposition that nests found near water were necessarily of this species (de Naurois & Morel 1995); in the absence of vocally-certain identifications this cannot be accepted. The nearest record to the Kenyan population is thus the Ndjamena area.

"Erard (in Chappuis *et al.* 1992) mentioned the possibility of *P. fluviatilis* ranging right across Africa, in the Sahel/Sudanian contact zone (it is more correctly a purely Sahelian species); he remarked that some museum specimens from Gambela, western Ethiopia could well prove to be *fluviatilis*, though having underparts less white than Chad birds. But without accompanying evidence of their vocalisations, such specimens

cannot be identified with certainty. These observations from Kenya show that Erard was on the right track."

References

Barlow, C., Wacher, T. & Disley, T. 1997. *A field guide to birds of The Gambia and Senegal.* Sussex: Pica Press.

Chappuis, C., Erard, C. & Morel, G.J. 1992. Morphology, habitat, vocalisations and distribution of the River Prinia *Prinia fluviatilis* Chappuis. *Proceedings of the Pan-African Ornithological Congress* 7: 481–488.

de Naurois, R. & Morel, G.J. 1995. Description des oeufs et du nid de la Prinia aquatique *Prinia fluviatilis. Malimbus* 17: 28–31.

Ottosson, U., Bengtsson, D., Gustafsson, R., Hall, P., Hjort, C., Leventis, A.P., Neumann, R., Pettersson, J., Rhönnstad, P., Rumsey, S., Waldenström, J. & Velmala, W. 2002. New birds for Nigeria observed during the Lake Chad Bird Migration Project. *Bulletin of the African Bird Club* 9: 52–55.

Scholte, P., de Kort, S. & van Weerd, M. 1999. The birds of the Waza-Logone area, Far North Province, Cameroon. *Malimbus* 21: 16–50.

Urban, E.K., Fry, C.H. & Keith, S. (eds) 1997. *The birds of Africa.* Vol. V. London: Academic Press.

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Bird records from the Isunkaviola Hills of Ruaha National Park, Tanzania

Robert Glen, M. Mtahiko, Liz De Leyser and Sue Stolberger

Ruaha National Park, situated in the mid-south of Tanzania (07°S, 34°E), covers an area of 10 300 km^2 and, together with the unpopulated game reserves surrounding the park, forms a contiguous ecosystem of some 45 000 km^2. The altitude is generally low, at between 750–1500 m, but the Isunkaviola Hills (07°45'S, 34°02'E) in the extreme western corner of the park reach an altitude of 1868 m. These hills are remnants of an ancient plateau sloping west and south from their north and northeast facing escarpment.

Vegetation in the park ranges from open grassland to mixed *Combretum* woodland and *Terminalia* woodland, areas of *Acacia* and larger tracts of *Brachystegia* woodland. The Isunkaviola Hills hold two areas of *Drypetes* climax forest, the largest of which is approximately 2.5 km^2 situated on high ridges, and an area of riverine forest in the Kilola Valley. These are the only such remnants in Ruaha Park. All gullies in the area hold *Drypetes* amongst other species, and most have small perennial streams along their courses. The riverine forest of the Kilola Valley (1730 m) is approximately 4 km long and 100 m wide. Several adjoining fingers of forest follow valleys or gullies that join the central Kilola. All have streams and several springs and marshes that help to feed the Kilola system. Both the Kilola riverine forested valley and the area of *Drypetes* forest are surrounded by *Brachystegia* woodland.

Until the present time the only studies carried out in the area were by Andres Bjornstadt between 1973 and 1976, when he made a comprehensive list of plants in Ruaha Park (reference unavailable). After several reconnaissance flights in October 1994, November 2000, February 2003, and December 2003, during which observations and GPS readings were made, it became clear that the geographical location of the Isunkaviola Hills, together with the isolated nature of the two substantial areas of mature *Drypetes* forest and one area of riverine forest, were likely to provide some interesting findings.

One reconnaissance flight in November 2000 revealed that the only area of equivalent forest type close to, though outside of, the park is on the Kigome Hills at 1890 m some 20 km away and separated by the Mzombe River valley. Whilst this locality does have some *Drypetes* forest, it is very

broken and interspersed with large areas of rock. The only riverine forested section, similar to the Kilola Valley, is in an extremely deep gorge with difficult access.

To date, 529 species of birds have been recorded in Ruaha National Park (R. Glen pers. obs.). Observations from 2001–2004 in the Isunkaviola Hills suggest that the birds in this particular part of the park have affinities both to the eastern Congo and the Eastern Arc Mountains such as Black-backed Barbet *Lybius minor* and Eastern Olive Sunbird *Cyanomitra olivacea.* These indicate possible relict connections with areas such as the Chunya-Mbeya highlands to the south and the Kigome Hills to the northwest, which until now have been neglected.

Methods

Two expeditions to the Isunkaviola Hills, in October 2001 and November 2002, gained access to the *Drypetes* forest. However, due to the difficult terrain, the Kilola Valley remained out of reach. A third expedition, in October 2003, gained access to the central *Drypetes* section (07°45'S, 34°02'E) and finally into the Kilola riverine forest where one day was spent undertaking a brief reconnaissance. During the three previous expeditions to the Isunkaviola Hills, access was permitted by vehicle to facilitate coverage of a larger area with our necessary equipment in a short space of time. The fourth expedition, in 2004, was conducted on foot, as this was in keeping with National Park regulations concerning wilderness zones. This expedition was based in the Kilola Valley (07°42'S, 34°02'E) for three weeks. A base camp was made at the foot of the escarpment and all equipment was ferried using seven porters over a period of four days. The escarpment face is extremely steep and made carrying of heavy loads difficult. During all four of the expeditions to the area extensive mist-netting was undertaken and field observations made.

Results

The following species recorded in the Isunkaviola Hills represent some geographical extensions to range and locality extensions to previous records.

Schalow's Turaco *Tauraco schalowi.* 6 November 2003 (07°48'S, 033°52'E, altitude 1677 m) and 10 November 2003 (07°45'S, 34°01'E, altitude 1812 m). In these localities the density was outstanding. This species was feeding on fruiting trees and drinking at forest-covered pools in the mornings. At the lower site Violet-crested Turaco *Tauraco porphyreolophus* was also present where they freely mixed whilst feeding with *T. schalowi.*

Racket-tailed Roller *Coracias spatulata*. All birds of this species in Ruaha National Park have entirely blue underparts and not, as stated in Stevenson & Fanshawe (2002), purplish throats like Lilac-breasted Roller *C. caudata.*

Black-backed Barbet *Lybius minor*. This bird is common throughout Isunkaviola and several were mist-netted at different sites, a number of these being in the Kilola Valley (07°42'S, 34°02'E, altitude 1730 m). These records represent a significant eastern extension of the known range (Fry *et al.* 1988). They were often seen feeding together with Whytes Barbet *Stactolaema whyttii*.

African Broadbill *Smithornis capensis*. This species is common throughout the Isunkaviola Hills in all localities visited. It inhabits a variety of altitudes but is dependant on forest or forested stream courses. An extremely high density was noted, with males displaying as little as 60 m apart.

Pearl-breasted swallow *Hirundo dimibiata*. Five birds were mist-netted whilst coming to drink at a small open pool in grassland on 20 November 2002 (07°44'S, 34°02'E). Subsequently, in September 2004 a small flock was observed on several occasions and were also seen, whilst perched in a marshy area, to be involved in breeding displays of mouth opening and fluttering (07°42'S, 34°02'E). Hitherto this species was known in Tanzania by only one record from Mbeya. Given the month and locality this could indicate a new breeding area.

African Hill Babbler *Pseudoalcippe abyssinica*. 10 November 2003 (07°45'S, 34°01'E, altitude 1812 m). These birds were mist-netted and observed in *Drypetes* forest. Notably, these birds were of the nominate race as opposed to the race *P. a. stierlingi* (Fry & Keith 2000) found in the Mufindi Highlands of the Eastern Arc, 165 km to the southeast of the Isunkaviola Hills.

Leaflove *Phyllastrephus scandens*. One in November 2002 (07°04'S, 34°01'E, altitude 1812 m). This bird was mist-netted in mature *Drypetes* forest. This species was also observed in the Kilola Valley (07°42'S, 34°02'E, altitude 1730 m) in September 2004. This record indicates a new locality extension and also a good forest indicator.

White-headed Black Chat *Myrmecocichla arnotti*. During our expedition of October 2002 SS noticed that females of this species were dramatically different from the norm with a white upper breast extending to the cheeks and throat and forming a complete white collar. The black of the head extended from the lores through the eye to the occiput, as opposed to only the white throat. During the expedition of November 2003 further observations were made (07°48'S, 33°52'E, altitude 1677 m). Several pairs were found over a large area, and all were either on eggs, or were feeding young in and out of nest-holes in trees. To date 40 pairs have been recorded and all birds seen in western Ruaha National Park conform to the same pattern as described (Keith *et al* 1992). One female was collected and material sent for DNA analysis.

The 40 pairs of this form have been observed over an area 73 x 70 km and the same bird has been seen in Katavi National Park some 450 km to the west. The birds in Katavi were photographed by R. Field on 30 September 2004.

We suspect that these birds may represent a new subspecies and that previous records in and to the west of Ruaha National Park could involve the same form but have been overlooked on account of the males being more prominent to observers. Further material is being collected in separate localities.

In observing plumage development in males of this species, we also noted an unrecorded transition in plumage development. Young males were initially all black but developed white eyebrows first, before the black crown slowly changed and became the typical white cap (Keith *et al.* 1992).

White-eyed Slaty Flycatcher ***Melaenornis fischeri.*** 10 November 2003 (07°45'S, 34°01'E, altitude 1812 m). This species was plentiful in the area and several pairs were noted feeding young out of the nest. One adult female and one juvenile were netted at forest edge and close to a fragmented thicket. This represents a locality extension and a good forest indicator.

African Dusky Flycatcher ***Muscicapa adusta.*** 10 November 2003 (07°45'S, 34°01'E, altitude 1812 m). This species was plentiful at this location and birds were inhabiting forest and forest edge. Both nest building and feeding of young out of the nest were observed. Adults and young were mist-netted. This species is also common in the Kilola Valley. These records are an extension of the range in the locality and a forest indicator.

White-tailed Crested Flycatcher ***Trochocercus albonotatus.*** These birds were observed in a forested gully on 3 October 2001 (07°48'S, 33°58'E, altitude 1700 m). This represents a locality extension and a good forest indicator.

Blue-mantled Crested Flycatcher ***Trochocercus cyanomelas.*** 6 November 2003 (07°48'S, 33°53'E, altitude 1677 m). In an area of open mixed tree cover and close to the eastern, upper headwater forested tributary of the Mzombe river. Four of these birds were observed together at length as they were involved in aggressive, territorial behaviour. This record represents an eastern extension of the race *T. c. viviax* (Urban *et al.* 1997).

Western Violet-backed Sunbird ***Anthreptes longuemarei.*** 7 November 2003 (07°48S, 33°53'E, altitude 1766 m) and September 2004 (07°42'S, 34°02'E) breeding. Whilst this species is recorded in southern Tanzania, it is of interest to note that the altitude and vegetational differences in the Isunkaviola Hills represent the divide in Ruaha between this and Eastern Violet-backed Sunbird *A. orientalis,* which is present in the low-altitude drier areas of Ruaha National Park (Fry & Keith 2000).

Eastern Double-collared Sunbird ***Cinnyris mediocris.*** 10 November 2003 (07°45'S, 34°01'E, altitude 1812 m) and September 2004 (07°42'S, 34°02'E, altitude 1730 m). In mixed open vegetation, between old *Brachystegia* woodland and *Drypetes* forest. Whilst these sightings are an extension to known range, we suspect that these are part of relict forest populations which have been overlooked (N. Baker and R. Bowie, pers. comm.)

Variable Sunbird ***Cinnyris venusta.*** September 2004 (07°42'S, 34°02'E, altitude 1730 m). During observations SS noticed a prominent blue colour to the backs of males, as opposed to the normal green sheen. All males also had a strong orange wash on the breast and rich orange pectoral tufts. R. Bowie (pers. comm.) has also seen this plumage difference in birds of the Ngorongoro Crater highlands in the north of Tanzania. Although this difference has already been noted in these two highland habitats, other situations may have been overlooked and require further study.

Eastern Olive Sunbird ***Cyanomitra olivacea.*** 5–8 November and 10–14 November 2003 (07°48'S, 33°52'E, altitude 1677 m; 07°45'S, 34°01'E) and September 2004 (07°42'S, 34°02'E, altitude 1730 m). In view of the large extension to the known range of this species, its presence in the area is again, in our opinion, an indication of the relict links to the Mbeya/Chunya Highlands and the Kigome Hills. In all birds mist-netted (82 in the Kilola Valley alone) both sexes had yellow pectoral tufts. One male had both a yellow throat and yellow pectoral tufts (Fry & Keith 2000).

Southern Citril ***Serinus hypostictus.*** This species was mist-netted throughout our Isunkaviola Hills locations and is not uncommon. These records represent an interesting extension to known range and form a part of a relict population hitherto not recorded (Fry & Keith 2004, N. Baker pers. comm.).

Discussion

These records from the Isunkaviola Hills indicate an important geographical location with links north, south, east and west which requires much more study. Two species of weaver in the area have remained unidentified at present and work continues to resolve this dilemma. The low-lying rift area which forms much of Ruaha and extends to the Usangu catchment creates the divide between Isunkaviola and the Eastern Arc highlands. Upon recent inspection of satellite imagery, it appears that the eastern and southern relict link to Isunkaviola may well be through the Mbeya/Chunya highlands. Unfortunately however, the area is also well used by poachers, not as a base to hunt from, but as an access route to other areas of the park and to Rungwe Game Reserve outside the park. In order for these poachers to make easier access routes for themselves they light many fires which continue to be very destructive to the remaining forest sectors and much damage is evident. This is critical as the remaining stands of these relict forest areas are being eroded. Due to its ecological status, this area has become a focus of conservation efforts. Ruaha National Park, under the leadership of MM (Chief Park Warden), is intensifying efforts to conserve this unique area. A management program for Isunkaviola developed by Ruaha National Park has begun. An access track, which was completed in December 2004, is now in use. This track was carefully designed to use the existing park boundary. A temporary ranger post, called Kimbi, has also just

been installed along this route and regular foot patrols are now taking place to help protect this delicate and special area.

References

Fry, C.H., Keith, S. & Urban, E.K. (eds) 1999. *The birds of Africa* Vol. III. London: Academic Press.

Fry, C.H. & Keith, S. (eds) 2000. *The birds of Africa* Vol. VI. London: Academic Press.

Fry, C.H. & Keith, S. (eds) 2004. *The birds of Africa* Vol. VII. London: Academic Press.

Keith, S., Urban, E.K. & Fry, C.H. (eds) 1992. *The birds of Africa* Vol. IV. London: Academic Press.

Stevenson, T. & Fanshawe, J. 2002. *Field guide to the birds of East Africa.* London: T. & A.D. Poyser.

Urban, E.K., Fry, C.H. & Keith, S. (eds) 1997. *The birds of Africa* Vol. V. London: Academic Press.

Robert Glen, Sue Stolberger
Ruaha National Park, P.O. Box 369, Iringa, Tanzania. Email: suestol@bushlink.co.tz
M. Mtahiko
Chief Park Warden, Ruaha National Park, P.O. Box 369, Iringa, Tanzania. Email: mtangomtahiko@hotmail.com
Liz De Leyser
P.O. Box 113, Iringa, Tanzania. Email: deleyser@africonline.co.tz

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Short communication

First nesting record for Collared Pratincole *Glareola pratincola* on the Kenyan coast

On 19 June 2004 I was conducting an ornithological survey with Colin Jackson in the Sabaki River Mouth area (03°09'S, 40°08'E). Approximately 3 km north of the river mouth, in an extensive sand dune area, we arrived at a large grassland patch which showed signs of heavy grazing. As we approached, five to six Collared Pratincoles *Glareola pratincola* took off, but instead of flying away stayed nearby or overhead making a repeated alarm call. As this was not normal behaviour we suspected they might be breeding and when one individual landed some 20 m from us and started a broken-wing display, we were even more sure of it. We decided to hide in a bush 50 m away from the site and watch to see if any bird returned to a nest.

Soon the birds relaxed and landed again on the grassland patch. Scanning across the site with a telescope, we noted one or two sitting facing down wind—a very unusual position for roosting birds which tend to face into the wind. One individual was only *c.*80 m away and was behaving very much as if on a nest. We therefore made a note of the spot and combed the area, eventually finding what we were looking for—a shallow, almost imperceptible hollow in the short grass with three eggs laid directly on the sand without any sign of nesting material. The eggs were a pale cream base-colour, heavily blotched with black and dark grey, more densely blotched on the more rounded end.

On 26 June 2004 I found another nest containing two eggs lying simply on open sand in the dunes that surround the grassland patch; they were half covered by the sand. This same day, the first nest was checked and it appeared to be as we had left it a week earlier. Another two nests were found on the 15 July 2004. One, containing two eggs, was in the sand dunes, sheltered on one side by a piece of dry cow dung. The other also had two eggs, laid in the sand beside some partially emerged roots. GPS co-ordinates were taken for all four nests.

Collared Pratincoles are known to occur regularly on the Kenyan coast from the Tana River Delta to the Sabaki River Mouth (Zimmerman *et al.* 1996, Lewis & Pomeroy 1989). East African breeding records are restricted to below 1500 m, mainly in low rainfall areas, especially at Murchison Falls National Park, Rwenzori Mountains National Park and Lakes Turkana, Magadi, Manyara and Rukwa (Britton 1980). The distribution maps in Urban *et al.* (1986) indicate that Collared Pratincoles breed, or probably breed, widely on the Kenya coast, but without reference to any supporting

records. However, more recently, Lewis & Pomeroy (1989) showed the species breeding in only seven squares: two in Amboseli, one in Tsavo East and five around Lake Turkana. Therefore this appears to be the first confirmed coastal breeding record for Kenya.

References

Britton, P.L.(ed) 1980. *Birds of East Africa: their habitat, status and distribution.* Nairobi: East Africa Natural History Society.

Lewis, A. & Pomeroy, D. 1989. *Bird Atlas of Kenya.* Rotterdam: A.A. Balkema.

Urban,E.K., Fry, C.H. & Keith S. (eds) 1986. *The birds of Africa* Vol. II. London: Academic Press.

Zimmerman, D.A., Turner, D.A. & Pearson, D.J. 1996. *Birds of Kenya and northern Tanzania.* South Africa: Friedman.

Simon Valle
Via Pizzo Bernina 2, 00141 Rome, Italy. Email: simon.valle@fastwebnet.it

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East Africa Rarities Committee report

The latest circulation of the East Africa Rarities Committee has resulted in the acceptance of eleven records for the region. These are detailed below. The committee will currently consider the first five records of any species for Kenya, Uganda and Tanzania. Records from other countries within the *Scopus* region (Sudan, Ethiopia, Djibouti, Somalia, Rwanda, Burundi, Zambia, Malawi and the Indian Ocean islands) can also be submitted to the editor of *Scopus*. The current committee members are: Neil Baker, David Fisher, Colin Jackson, Jeremy Lindsell, Willis Okech, David Pearson and Don Turner. Please send submission to jeremy.lindsell@rspb.org.uk.

Red-footed Booby ***Sula sula***
First record for Tanzania, Latham Island, 19 November 1993, Matt Richmond and Olof Linden.

Brown Booby ***Sula leucogaster***
First record for Tanzania, Latham Island, 19 November 1993, Matt Richmond and Olof Linden.

Cape Shoveler ***Anas smithii***
First record for Tanzania, Boma Ng'ombe, west Kilimanjaro, northern Tanzania, 9 October 1997, Neil Baker.

Beaudouin's Snake-Eagle ***Circaetus (gallicus) beaudouini***
First record for Kenya, Mungatis, western Kenya, 21 January 2001, David Fisher, Mel Ogala, Jim Bangma and Sunbird tour group.

Short-toed Snake-Eagle ***Circaetus gallicus***
First record for Kenya, Tsavo East National Park, 2 February 2001, David Fisher, Mel Ogala, Jim Bangma and Sunbird tour group.

White-crowned Plover ***Vanellus albiceps***
First record for Uganda, single bird, Murchison Falls National Park, 10 July 2003, Dave Richards.

White-crowned Plover ***Vanellus albiceps***
Second record for Uganda, pair, Murchison Falls National Park, 29 January 2004, D. Pomeroy, S. Arizio, G. Kaphu, P. Kinyaa, M. Ellison, M. Ellison, F. Oyoo.

Masked Shrike ***Lanius nubicus***
First record for Tanzania, Pemba Island, 20 November 2003, Hugh Buck and Nick Borrow.

Black-eared Wheatear ***Oenanthe hispanica***
Third record for Kenya, Nakuru National Park, Kenya, 4 November 2001, Imre Loefler.

Grasshopper Warbler *Locustella naevia*
Second record for Kenya, ringed, Lake Paradise, Marsabit Reserve, 8 March 2000, Luca Borghesio and Nicodemus Nalianya.

River Prinia *Prinia fluviatilis*
First record for East Africa, several pairs holding territory, near Lokichokio, northern Kenya, 8 August 2001, Brian Finch and Jeffrey James.

Crab Plovers ringed in Eritrea
During a four year study on the distribution, ecology and breeding biology of the Crab Plover *Dromas ardeola* on the islands off Central Eritrea, in summer 2005 we marked 11 individuals (adults and chicks) with metal rings (Istituto Nazionale Fauna Selvatica) on the left leg and with coloured plastic rings on the right leg. We placed the rings on the tibiotarsus. Anyone who records or collects any of these individuals is kindly invited to inform Giorgio Chiozzi, Museo Civico di Storia Naturale, Corso Venezia 55, 20121 Milano, Italy. Email: giorgio.chiozzi@comune.milano.it

Book review

Borrow, N. & Demey, R. 2004. Field guide to the birds of Western Africa. London: Christopher Helm. Pp. 510, 148 plates by N. Borrow. ISBN: 0 7136 6692 7. UK price £29.99.

The publication of the original hardback version of this book back in 2001 was a long-awaited and revolutionary step for all birdwatchers active in West Africa. After years of struggling with cumbersome copies of Mackworth-Praed & Grant, and Birds of Africa and the more sensibly-sized but woefully inadequate Serle *et al.* (1977), it was a huge relief to have a high quality comprehensive fieldguide for the region, even if it was rather heavy (2kg) and expensive (£55).

So the appearance of this smaller paperback version has been very eagerly awaited, to make it both more affordable and portable, and thereby more accessible to people active in the field. On both of these scores, this edition represents a reduction of almost 50 %, which makes it more manageable and accessible, if still rather pricey for many at just under £30. The main way of reducing the bulk has been to omit the text accounts of plumage and voice descriptions, habits, similar species and status and distribution. Having said this, the maps have been maintained at the same size (with some revisions), as has the text facing the plates, which has just been reformatted to save space. The maps are interspersed in the book, so are close to the plates of the species, unlike in the hardback edition where they are at the back. The page size has been reduced but is still about 80 % of the

original size, and there is the added bonus of a number of new plates, mainly of regional and island endemics as well as some extra vagrant species. Perhaps more significantly though, there are some useful revisions of plates; for example, the hornbills in flight (an extremely helpful set of line drawings in the first edition) is now incorporated as a full colour plate. There are also some further improvements to the greenbul plates, which were already one of the biggest revelations of the first edition, being of outstanding quality. Several recent taxonomic revisions have been incorporated too (e.g. Western and Eastern Olivaceous Warbler) and illustrated separately. All of this is extremely positive, and makes this book a great asset even for those already owning the first edition. My only serious reservation is that in my copy, many (but not all) of the plates are slightly, but significantly, darker than in my hardback edition, and this does make a number of species somewhat harder to discern.

Overall, this edition is an important step in the right direction for West African ornithology, which has lagged behind East and southern Africa for this kind of quality field guide.

Chris Bowden
The RSPB, The Lodge, Sandy, Bedforshire, UK SG19 2DL.
Email: chris.bowden@rspb.org.uk

of the rainforests of Eastern Africa. Cambridge: Cambridge University Press.
Urban, E.K., Fry, C.H. & Keith, S. (eds) 1986. *The birds of Africa.* Vol. II. London: Academic Press.

Contributions should be submitted electronically or on paper. Electronic submissions should be emailed to the editor as a Microsoft Word document or a Rich Text Format (RTF) file. All figures (e.g. maps, graphs, photographs) should be supplied as separate, high resolution, graphics files (e.g. TIFF, EPS, JPEG, WMF) and not inserted into the text file. It will not be possible to reproduce figures inserted into the text file. The desired position of figures in the text should be indicated by the figure caption. For paper submissions, manuscripts should be typed in double-spacing on one side of the paper only, with wide margins all round. Original black-and-white photographs and line illustrations should not be larger than A4 (210 x 297 mm). Line illustrations should be on good quality white paper or board, or on tracing material, with lettering of professional quality (if this is not possible, label an overlay, not the original figure).
Authors of papers receive five copies, and authors of short communications one copy, of their contribution *gratis*. Extra copies, charged at cost, must be ordered when the MS is accepted. All authors receive a PDF of the pages on which their article appears.

Please send all contributions to:
Dr Jeremy Lindsell,
The Editor, *Scopus*, c/o RSPB, The Lodge, Sandy, Bedfordshire, SG19 2DL UK.
Email: jeremy.lindsell@rspb.org.uk

Rare birds in East Africa
Records of rare birds from Kenya, Tanzania and Uganda are assessed by the East Africa Rarities Committee. Records from other countries in the region can also be submitted for review and possible publication in Scopus. A full account of the record should be sent to the Scopus editor at the address above or to East Africa Rarities Committee, c/o Nature Kenya, P.O. Box 44486, G.P.O. 00100, Nairobi, Kenya.
Tel. +254 20 3749957.
Email: jeremy.lindsell@rspb.org.uk

Ringing scheme of eastern Africa
This covers several countries in the area. Qualified and aspiring ringers should contact the ringing organizer, Graeme Backhurst, P.O. Box 15194, Nairobi, Kenya.
Tel. +254 20 3891419.
Email: graeme@wananchi.com

EANHS Nest Record Scheme
Details of most kinds of breeding activity are welcomed by the scheme and nest record cards may be obtained free of charge from the Nest Record Scheme organizer, c/o Nature Kenya, P.O. Box 44486, G.P.O. 00100, Nairobi, Kenya.
Tel. +254 20 3749957.
Email: office@naturekenya.org

The BirdLife International Partnership in eastern Africa
The BirdLife Partnership in eastern Africa co-ordinates bird conservation work and produces several other publications of interest to ornithologists.

Ethiopian Wildlife & Natural History Society, P.O. Box 13303, Addis Ababa, Ethiopia.
Tel. +251 1 628525, fax +251 1 630484.
Email: ewnhs@telecom.net.et

Nature Kenya, the East Africa Natural History Society, P.O. Box 44486, G.P.O. 00100, Nairobi, Kenya.
Tel. +254 20 3749957.
Email: office@naturekenya.org
www.naturekenya.org

Nature Uganda, the East Africa Natural History Society, P.O. Box 27034, Kampala, Uganda.
Tel. +256 41 540719, fax +256 41 533528.
Email: nature@natureuganda.org
www.natureuganda.org

Wildlife Conservation Society of Tanzania, P.O. Box 70919, Dar es Salaam, Tanzania.
Tel. +255 22 2112518 / 2112496, fax +255 22 2124572.
Email: wcst@africaonline.co.tz

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